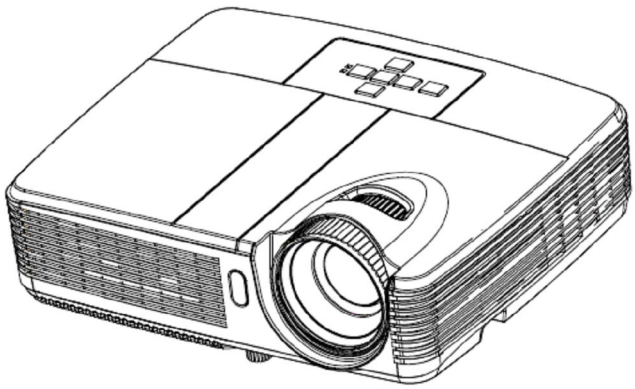
OPTOMA

ES550/ES551
EX550/EX551

Service Manual



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Date: 2011/06/20

Update History

Date of issue	Published by	Version	Desc.
2011/05/30	Ciom	A	New version released.
2011/06/20	Ciom	B	Updated the Chapter 2 Firmware Upgraded Flow

■ Safety Instructions

SAFETY PRECAUTIONS

WARNING:

The chassis of this projector is isolated (COLD) from AC line by using the converter transformer. Primary side of the converter and lamp power supply unit circuit is connected to the AC line and it is hot, which hot circuit is identified with the line ( ) in the schematic diagram. For continued product safety and protection of personnel injury, servicing should be made with qualified personnel.

The following precautions must be observed.

1:An isolation transformer should be connected in the power line between the projector and the AC line before any service is performed on the projector.

2:Comply with all caution and safety-related notes provided on the cabinet back, cabinet bottom, inside the cabinet or on the chassis.

3:When replacing a chassis in the cabinet, always be certain that all the protective devices are installed properly, such as, control knobs, adjustment covers or shields, barriers, etc.

DO NOT OPERATE THIS PROJECTOR WITHOUT THE PROTECTIVE SHIELD IN POSITION AND PROPERLY SECURED

4:Before replacing the cabinet cover, thoroughly inspect the inside of the cabinet to see that no stray parts or tools have been left inside

Before returning any projector to the customer, the service personnel must be sure it is completely safe to operate without danger of electric shock

PRODUCT SAFETY NOTICE

Product safety should be considered when a component replacement is made in any area of the projector. Components indicated by mark ⚠ in the parts list and the schematic diagram designate components in which safety can be of special significance. It is, therefore, particularly recommended that replacement of there parts must be made by exactly the same parts.

SERVICE PERSONNEL WARNING

Eye damage may result from directly viewing the light produced by the lamp used in this equipment. Always turn off lamp before opening cover .The Ultraviolet radiation eye protection required during this servicing.
Never turn the power on without the lamp to avoid electric-shock or damage of the devices since the stabilizer generates high voltages (15kV-25kV) at its starts.
Since the lamp is very high temperature during units operation replacement of the lamp should be done at least 45 minutes after the power has been turned off, to allow the lamp cool-off.

DO NOT ATTEMPT TO SERVICING THE <u>REMOTE CONTROL UNIT</u>.

Laser Beam may be leaked out when in disassemble the Unit. As the Laser Beam used in this Remote control unit is harmful to the eyes.

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1 System Introduction

1.1 Technical Specification

Item	CONTENT
Display Type	Single 0.55” DLP panel
Resolution(Pixels)	ES550/ES551: SVGA (800x600pixels) EX550/EX551: XGA (1024x768 pixels)
Lamp	180W
Zoom Ratio	1.1X
F/No.	1.97 - 2.17
Focal length	21.95 - 24.18mm
Screen size	30” - 300”
Projection Type	Front, Rear, Ceiling
Input Source	D-Sub 15-pin x 2, S-Video x 1, Video x 1, Audio signal input (3.5mm stereo mini jack) x 1, HDMI (ES551/EX551 only)
Output Source	D-Sub 15 pin x 1, Audio signal output (3.5 mm stereo mini jack) x1
Control terminal	RS-232 x 1, Mini USB type x1 (supports firmware upgrade and remote mouse control)
Speaker	2 watt x 1
Scanning frequency Horizontal frequency Vertical frequency	 31 - 100 KHz 50 - 120 Hz
Power requirement	AC 100-240 V, 50 - 60 Hz, 2.6A
Power consumption	245 W (Max.)
Digital Keystone Correction	Vertical + / - 30°
Environment	Operating: Temperature:0° C to 40° C Humidity: 10-80% maximum Storage: Temperature: -20° C to 60° C Humidity: 30-85%
Dimension (W x D x H)	282.9 x 231.1 x 94.7 mm
Weight	2.2 Kg

Note: Designs and specifications are subject to change without prior notice

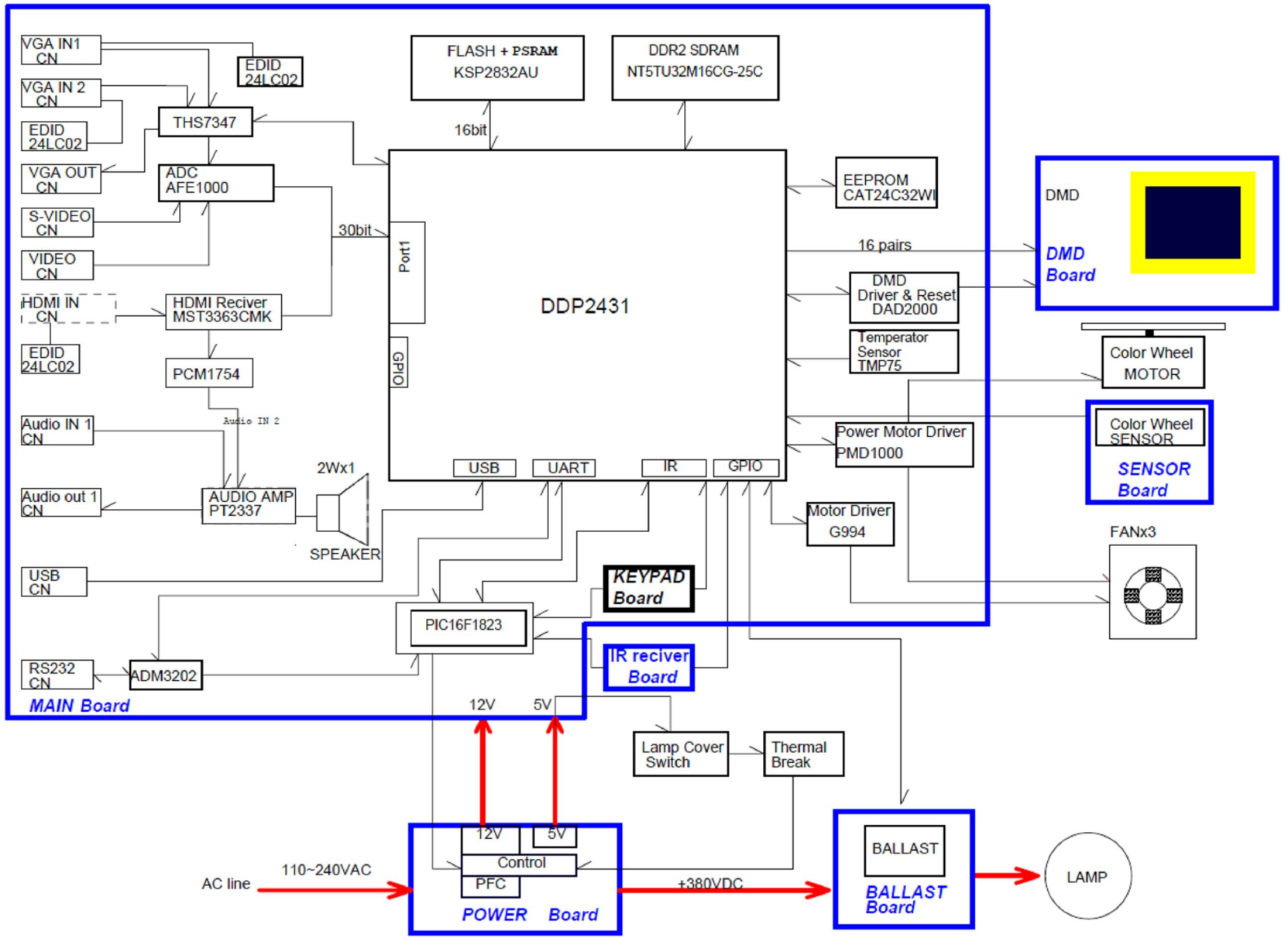
Attention for handing

- Do not touch the lamp until it has cooled completely, because the lamp is very hot during operation and immediately after turned off.
- The lamp has to be fixed firmly to the base or socket.
- Turn off the power supply during maintenance.
- Do not hold the lamp except outer surface of the reflector.
- Wear protective gloves and eyeglasses when handling the lamp.
- Any unusual shock or vibration to the lamp should be avoided.
- The lamp contains the mercury. Its breakage might cause mercury to flow out of the reflector. Please manage provision at the customer's product.
- Do not pull the lead wire and plug by more than 24.5N.
- Please be careful of handling the lamp because it is made of glass.
- Please notice for keeping or handling the lamp, because there is a projection of this lamp with reflector ahead.
- Do not touch the bulb and the mirror area of the reflector.

Attention for use

- Do not close or cover the lamp with any flammable stuff.
- During operation, the lamp is under extremely high pressure. Please manage provision at the customer's product to prevent fragments of bulb and mercury from flowing out of it. If the lamp bursts in case of an emergency, the sound will be occurred.
- Lamp operation should be with the specified lamp driver and the system only.
- Do not look at the lamp directly during operations.
- Do not expose your skin directly. We recommend to you to put on something for protection for your skin. For example, long sleeve shirt, gloves, glassed and so on.
- Do not modify the lamp and never use a lamp that has been modified.
- Any unusual shock or vibration to the lamp should be avoided during operation.
- Do not use any broken lamps.
- Dispose of used lamps according to your local instruction.
- Do not turn on the lamp while the system is opened.
- The lamp contains mercury. If the lamp bursts during operation ventilate the area sufficiently to avoid inhaling harmful mercury fumes.
- Use the lead below 200℃ to prevent a deterioration of cladding clad of the fluorocarbon resin.
- The lead wire insulation clad shouldn't touch the reflector.
- Exchange the lamp that has already passed the life time immediately.

1.2 ES550/ES551/EX550/EX551 System Block Diagram



2 Firmware Upgraded Flow

This provides the information regarding relevant equipments and upgrading procedure for firmware upgrade.

Purpose:
Flash Loader vX.X.exe flash loader is for upgrading image file to projector and is be designed to execute on Windows 2000/Windows XP/Windows Vista/Win 7.

Note:

Please check the firmware version before any firmware upgrade procedures. During firmware download period, please do not shut down PC or projector, this will cause flash memory's damage. And need to return the unit to manufacturer for flash memory recovery.

2.1 Setup Tool/Equipment

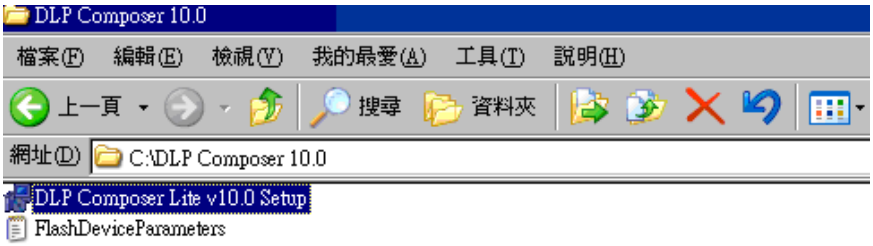
- Computer
- Power Cord
- USB Cable

2.2 Upgrading Procedure

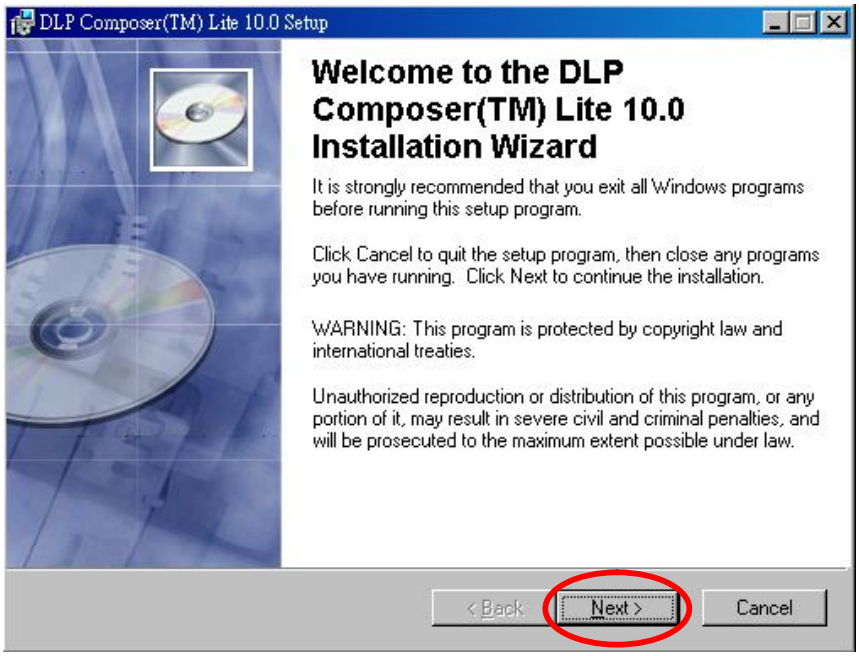
1) Upgrading the Firmware on the Unit

To update the firmware on your ES550/ES551/EX550/EX551 projector, you first need to install the Firmware Update Utility software DPL Composer Lite v10.x.x on your PC.

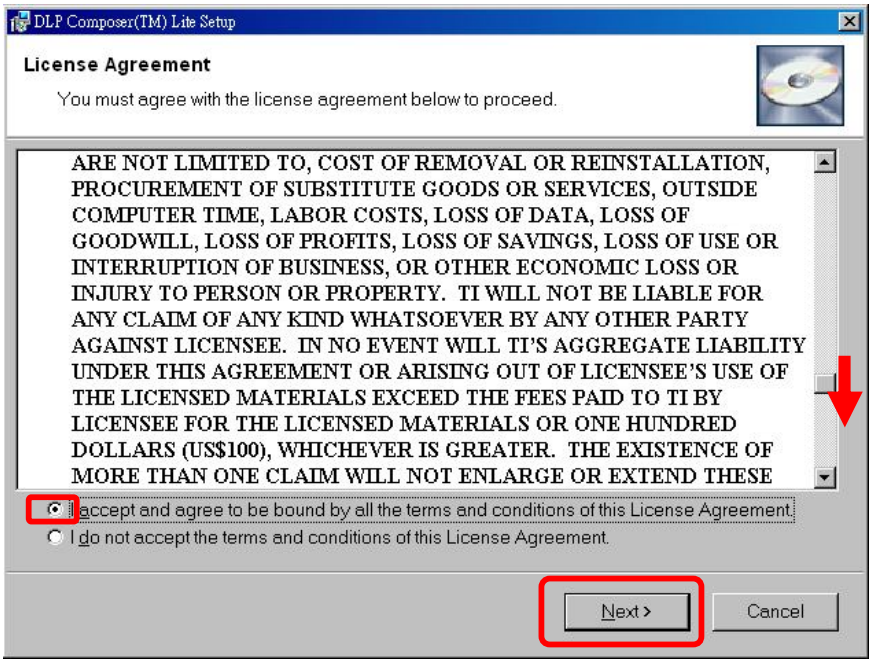
Open Windows Explorer, locate the DLP Composer Lite v10.x.x Setup, and then double-click the icon to launch installation procedure, and follow the on-screen instructions to finish the installation procedure.



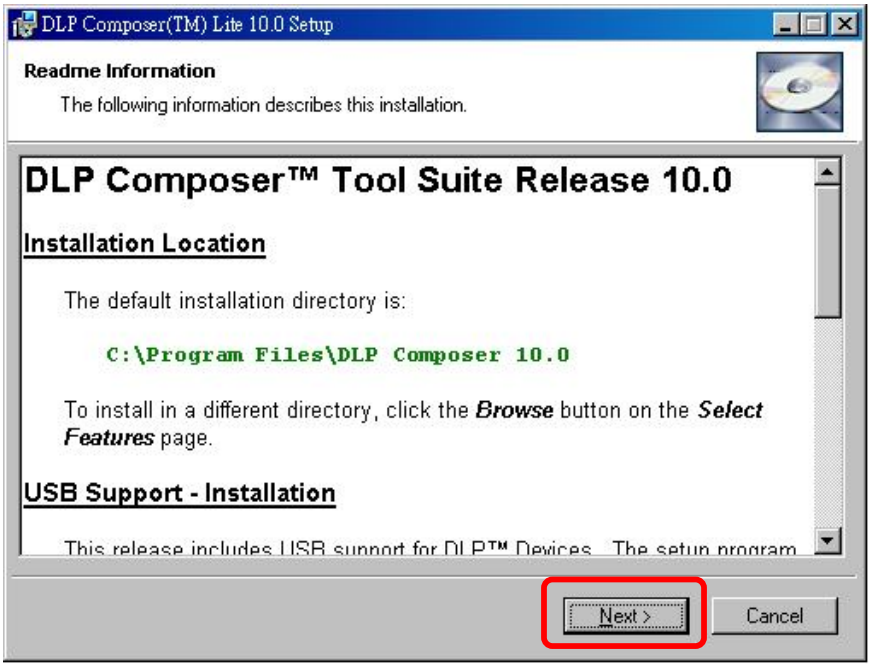
Verify you have opened the DPL Composer , then click **Next >**


DLP Composer(TM) Lite 10.0 Setup
Welcome to the DLP Composer(TM) Lite 10.0 Installation Wizard
It is strongly recommended that you exit all Windows programs before running this setup program.
Click Cancel to quit the setup program, then close any programs you have running. Click Next to continue the installation.
WARNING: This program is protected by copyright law and international treaties.
Unauthorized reproduction or distribution of this program, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under law.
< Back
Next >
Cancel

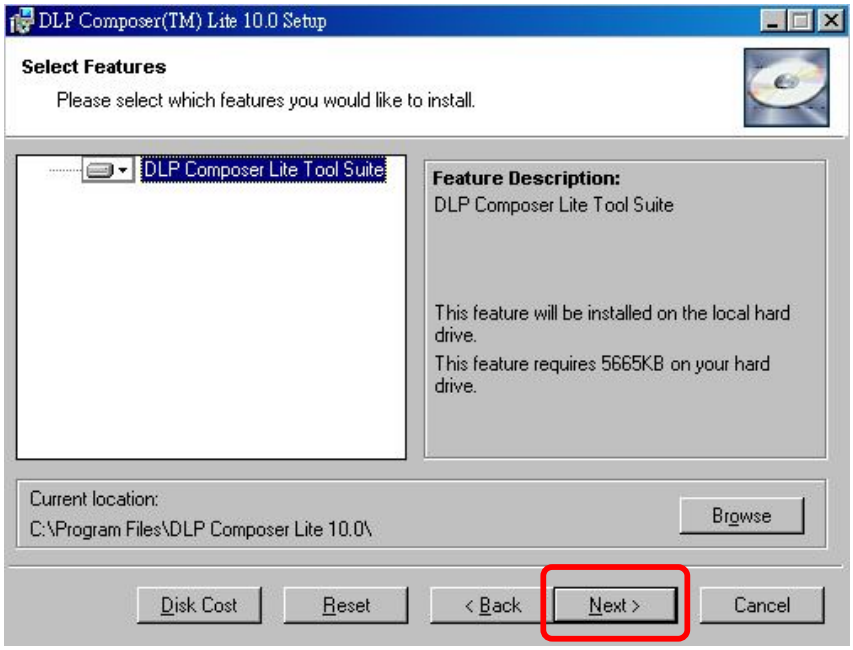
Once you have read the License Agreement and agree, select the I Agree radio button , then click **Next >**.


DLP Composer(TM) Lite Setup
License Agreement
You must agree with the license agreement below to proceed.
ARE NOT LIMITED TO, COST OF REMOVAL OR REINSTALLATION, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES, OUTSIDE COMPUTER TIME, LABOR COSTS, LOSS OF DATA, LOSS OF GOODWILL, LOSS OF PROFITS, LOSS OF SAVINGS, LOSS OF USE OR INTERRUPTION OF BUSINESS, OR OTHER ECONOMIC LOSS OR INJURY TO PERSON OR PROPERTY. TI WILL NOT BE LIABLE FOR ANY CLAIM OF ANY KIND WHATSOEVER BY ANY OTHER PARTY AGAINST LICENSEE. IN NO EVENT WILL TI'S AGGREGATE LIABILITY UNDER THIS AGREEMENT OR ARISING OUT OF LICENSEE'S USE OF THE LICENSED MATERIALS EXCEED THE FEES PAID TO TI BY LICENSEE FOR THE LICENSED MATERIALS OR ONE HUNDRED DOLLARS (US$100), WHICHEVER IS GREATER. THE EXISTENCE OF MORE THAN ONE CLAIM WILL NOT ENLARGE OR EXTEND THESE
I accept and agree to be bound by all the terms and conditions of this License Agreement
I do not accept the terms and conditions of this License Agreement.
Next >
Cancel

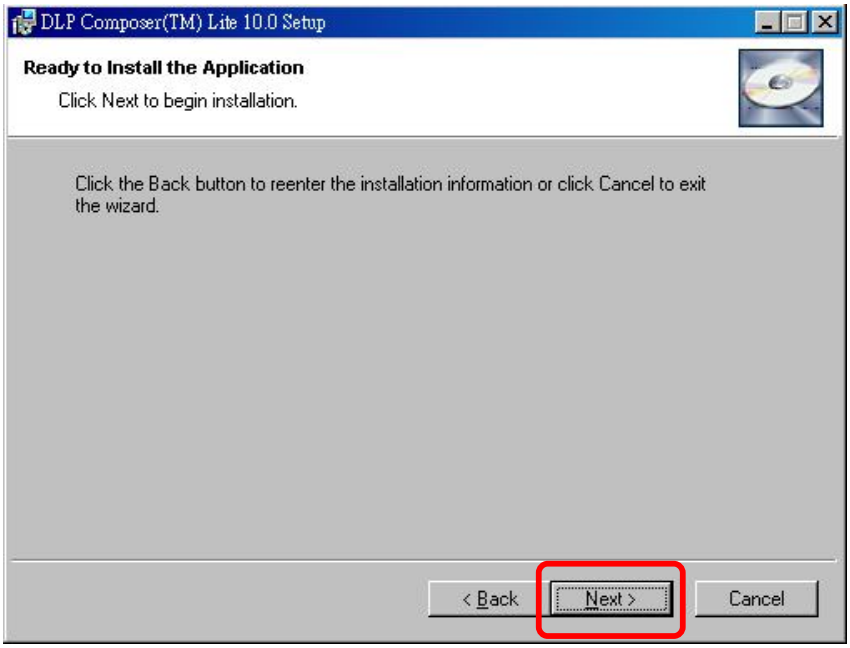
In the box of Readme Information, after read click **Next>**


DLP Composer(TM) Lite 10.0 Setup
Readme Information
The following information describes this installation.
DLP Composer™ Tool Suite Release 10.0
Installation Location
The default installation directory is:
C:\Program Files\DLP Composer 10.0
To install in a different directory, click the Browse button on the Select Features page.
USB Support - Installation
This release includes USB support for DLP™ Devices. The setup program
Next >
Cancel

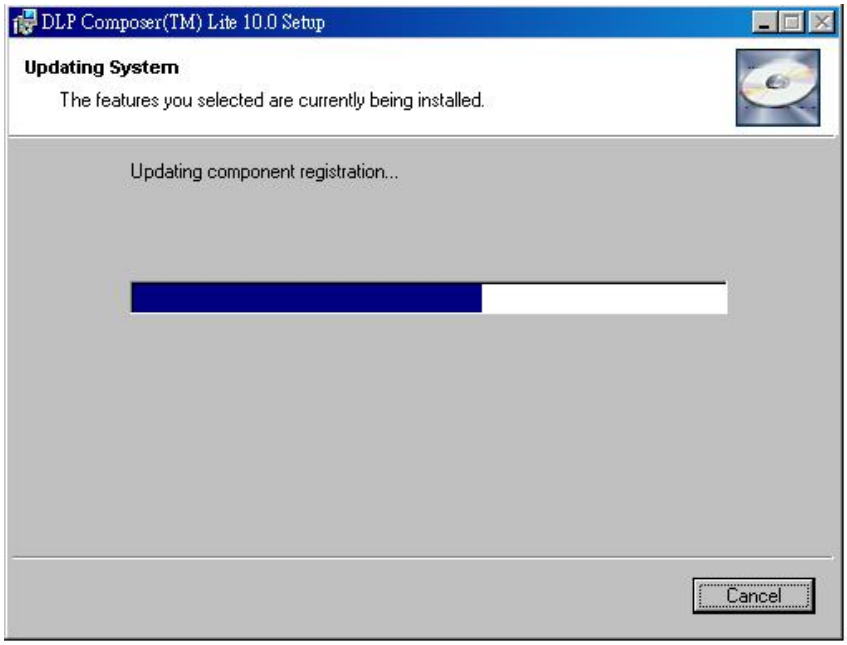
Select which features you would like to install, and then click **Next>**


DLP Composer(TM) Lite 10.0 Setup
Select Features
Please select which features you would like to install.
DLP Composer Lite Tool Suite
Feature Description:
DLP Composer Lite Tool Suite
This feature will be installed on the local hard drive.
This feature requires 5665KB on your hard drive.
Current location:
C:\Program Files\DLP Composer Lite 10.0\
Browse
Disk Cost
Reset
< Back
Next >
Cancel

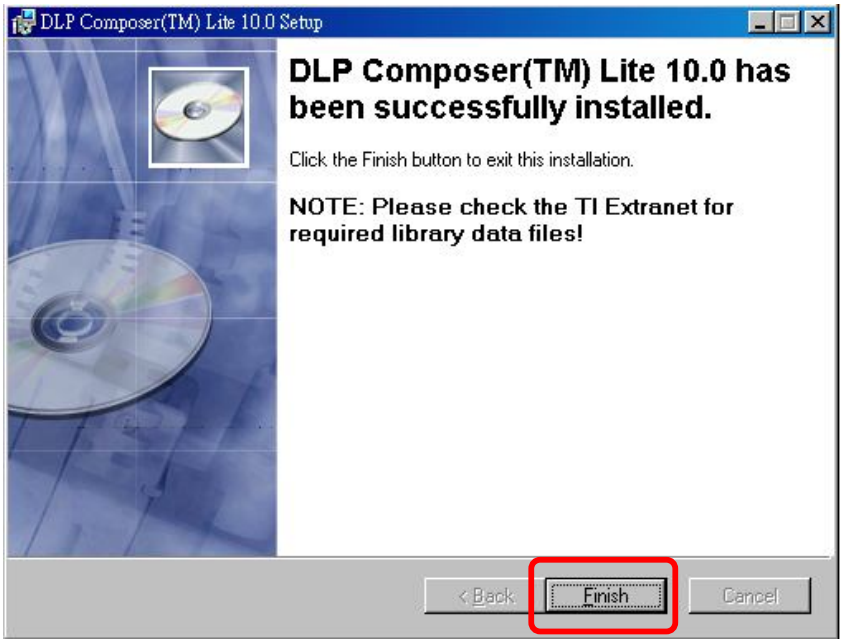
Click **Next** to begin installation


DLP Composer(TM) Lite 10.0 Setup
Ready to Install the Application
Click Next to begin installation.
Click the Back button to reenter the installation information or click Cancel to exit the wizard.
< Back
Next >
Cancel

You'll see a progress bar as the DLP Composer is installed



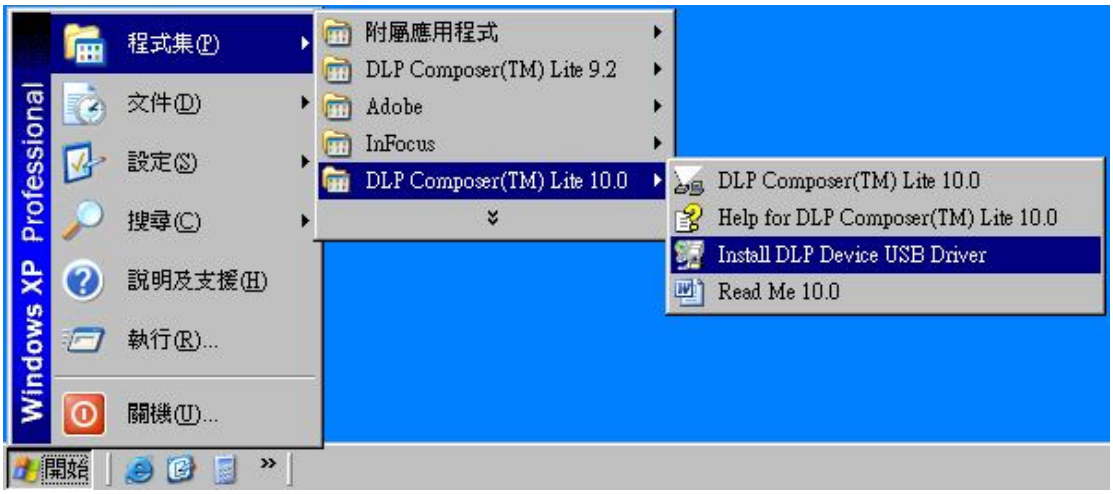
Once the installation is complete, select **Finish**


DLP Composer(TM) Lite 10.0 Setup
DLP Composer(TM) Lite 10.0 has been successfully installed.
Click the Finish button to exit this installation.
NOTE: Please check the TI Extranet for required library data files!
< Back
Finish
Cancel

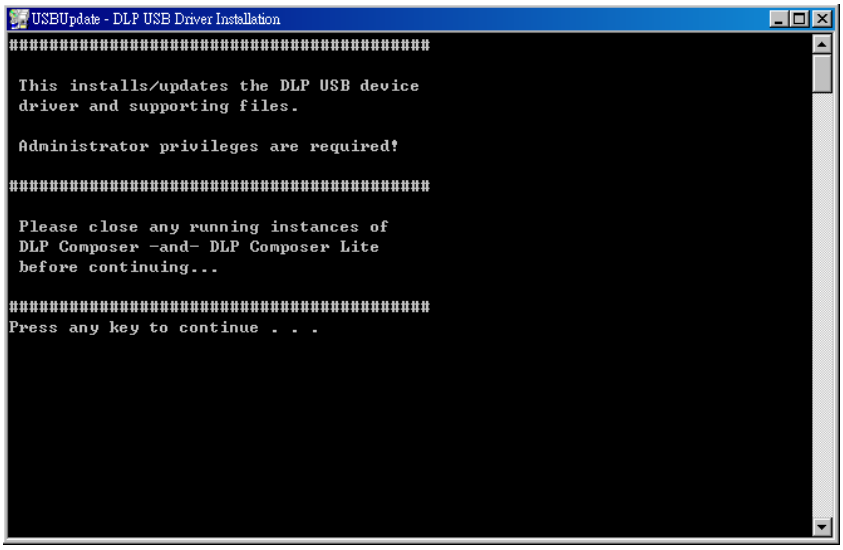
The DLP Composer Icon will appear on desktop of WindowsTM after successful installation.

2) Install DLP Processor USB Driver

1. If DLP Composer Lite does not be installed yet, please follow the description of section DLP Composer Lite Installation to install it first.
2. Please click the ”Install DLP Processor USB Driver” (as below graphic) to install USB Driver.



During installation, the installer will show a DOS screen. This screen will close itself and the install will continue automatically.

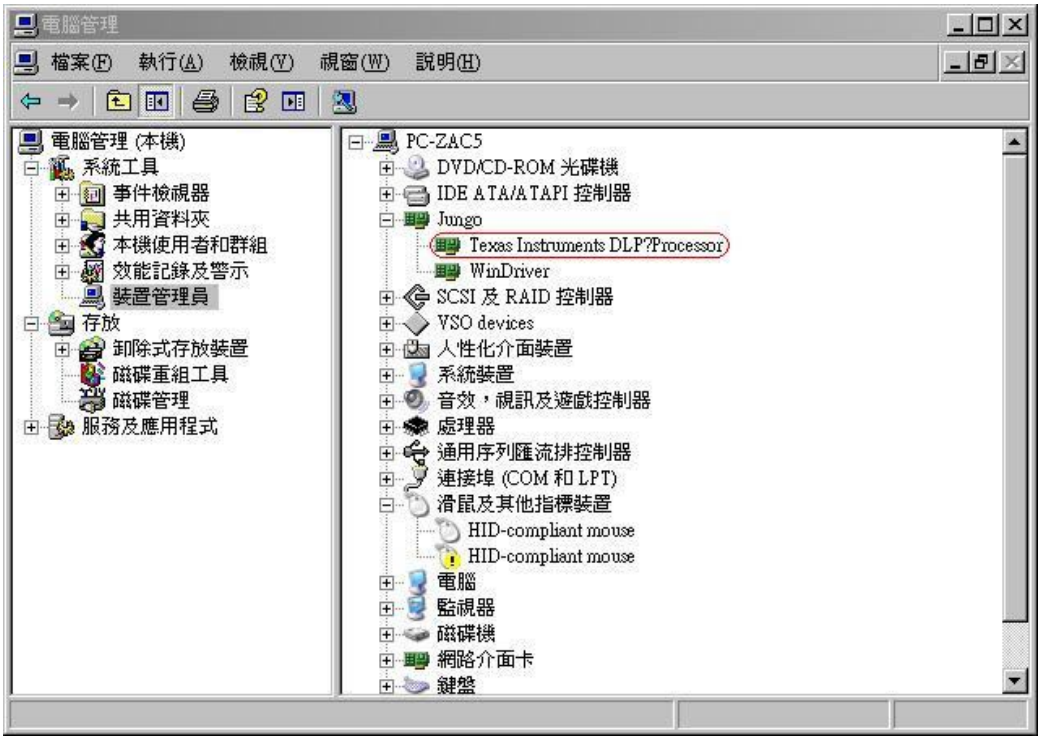

USBUpdate - DLP USB Driver Installation
This installs/updates the DLP USB device
driver and supporting files.
Administrator privileges are required!
Please close any running instances of
DLP Composer -and- DLP Composer Lite
before continuing...
Press any key to continue . . .

3) Upgrade the firmware on the projector

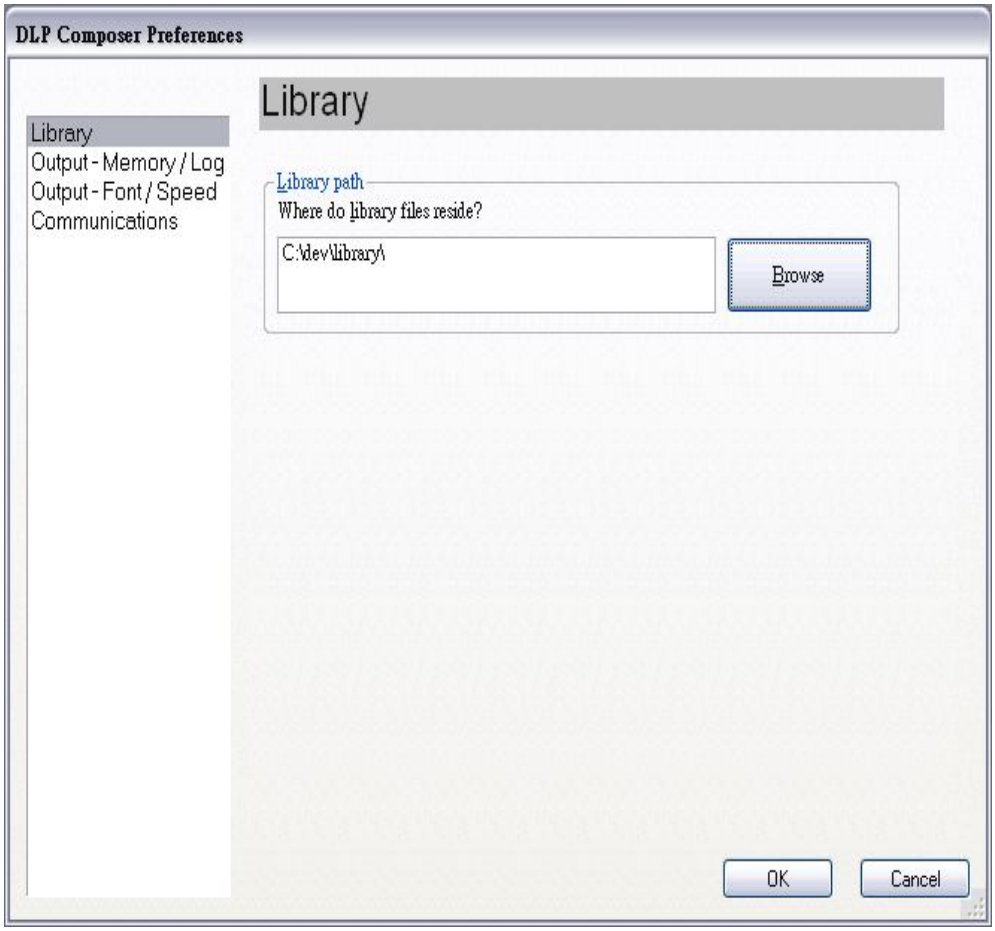
To update firmware, you need a USB type A to USB type B cable (available at any electronics store). Don't connect the cable until these instructions tell you to do so.
IMPORTANT! While the firmware is being downloaded to the projector, do not shut down the computer or projector or disconnect the USB cable. This could result in flash memory damage, requiring the projector to be returned for service.

Firmware upgrade procedure:

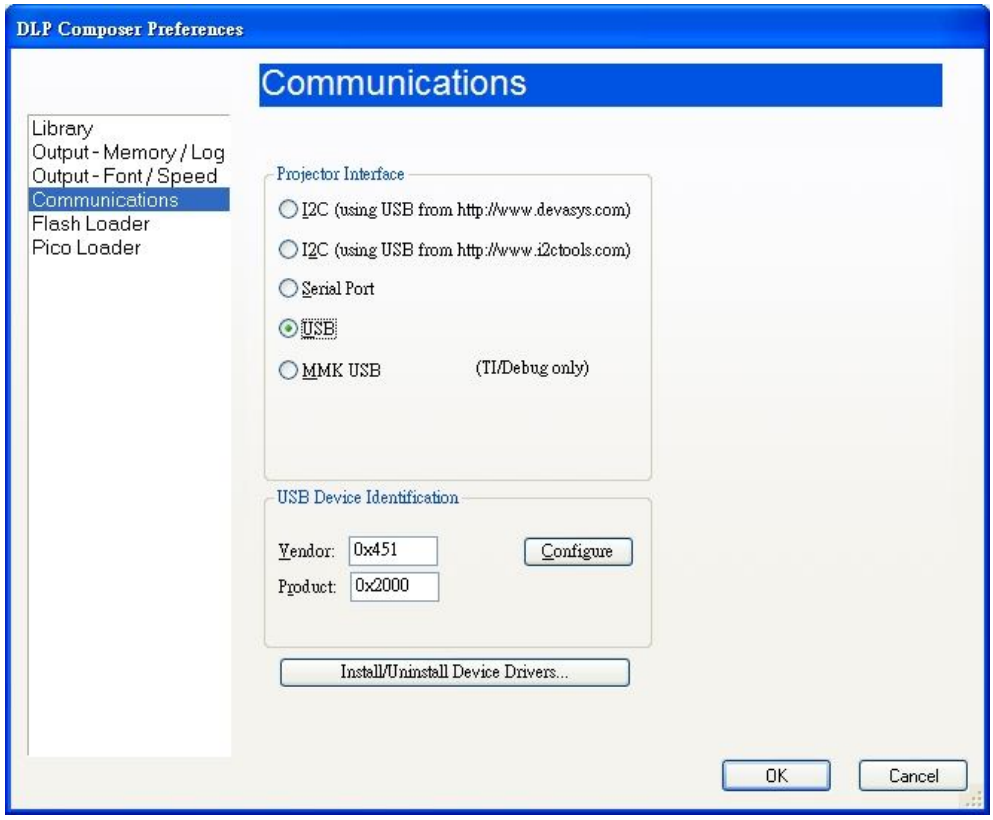
1. If DLP Composer Lite does not be installed yet, please follow the description of section DLP Composer Lite Installation to install it first.
2. If USB Driver does not be installed yet, please follow the description of section Install DLP Composer USB Driver to install it.
3. Please press and hold (do not release) both **POWER** and **MENU/EXIT** button of projector, then connect AC power to projector. After few seconds, the LEDs, which on the up-cover of projector, will become POWER LED blue/solid light and TEMP/LAMP LED purple/flash light. It denotes that the projector is ready for firmware update.
4. Please connect laptop and projector with USB cable. After connect laptop and projector, you may find Jungo\Texas Instruments DLP™ Processor at Device Manager of Windows OS.



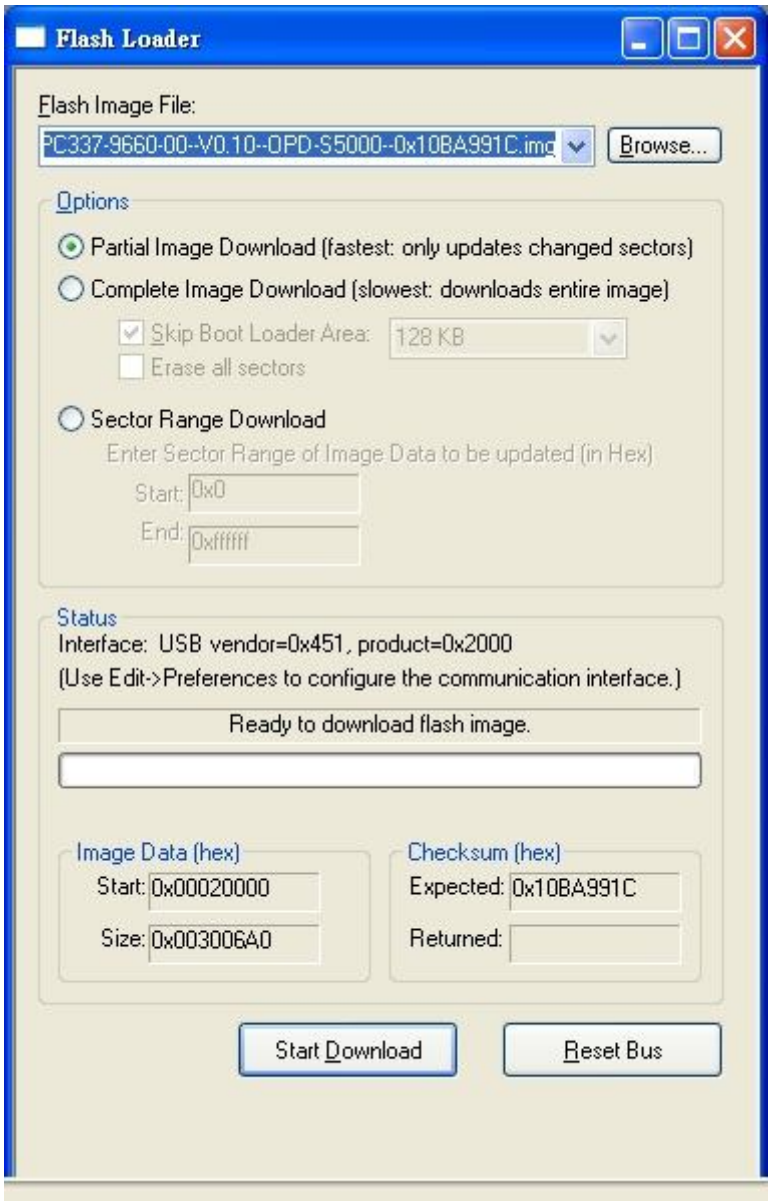
5. Please locate file FlashDeviceParameters.txt and image file of firmware in folder C:\dev\Library\.
6. Launch DLP Composer Lite, manipulate Edit\Preferences… menu, and change the Library path of DLP Composer Lite to be C:\dev\Library\.



7. Change the USB Device Identification of DLP Composer Lite to be Vendor: **0x451**, Product: **0x2000**.

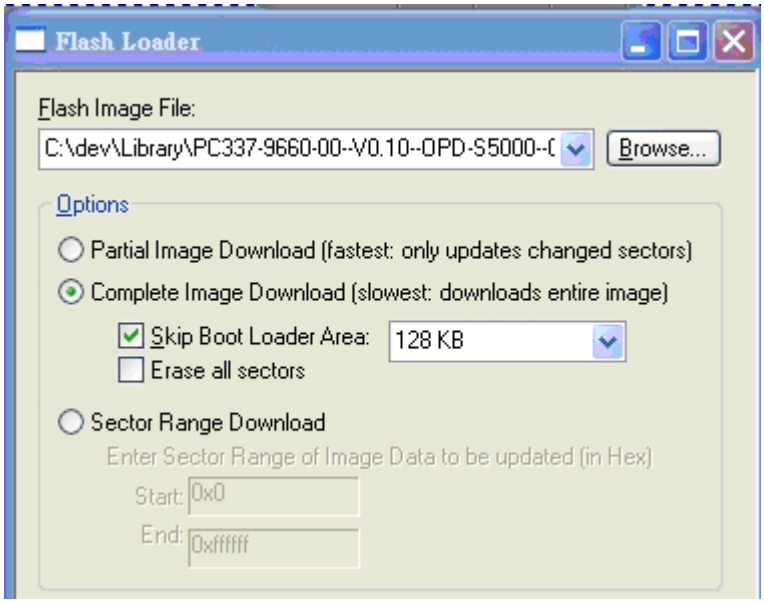


8. Click DLP Composer Lite\Flash Loader, and change Flash Image File to be C:\dev\Library\.
   Comment:
   I. If the target projector is SVGA with HDMI (ES551/OPD-S5001) then use firmware image file PC337-9660-00--V0.10--OPD-S5000--0x10BA991C.img.
   II. If the target projector is XGA with HDMI (EX551/OPD-X5001) then use firmware image file PC437-9660-00--V0.10--OPD-X5000--0x10C86D1A.img.

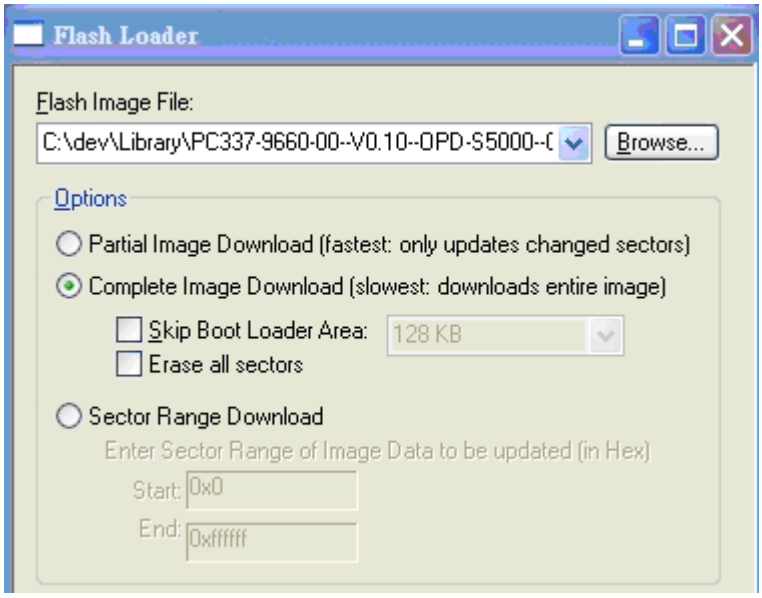


9. Select the Skip Boot Loader Area check box, when you do not want to overwrite boot loader of projector, **as picture 1 (recommend)**. Otherwise, do not select the Skip Boot Loader Area check box, when you want to overwrite the boot loader, as picture 2.

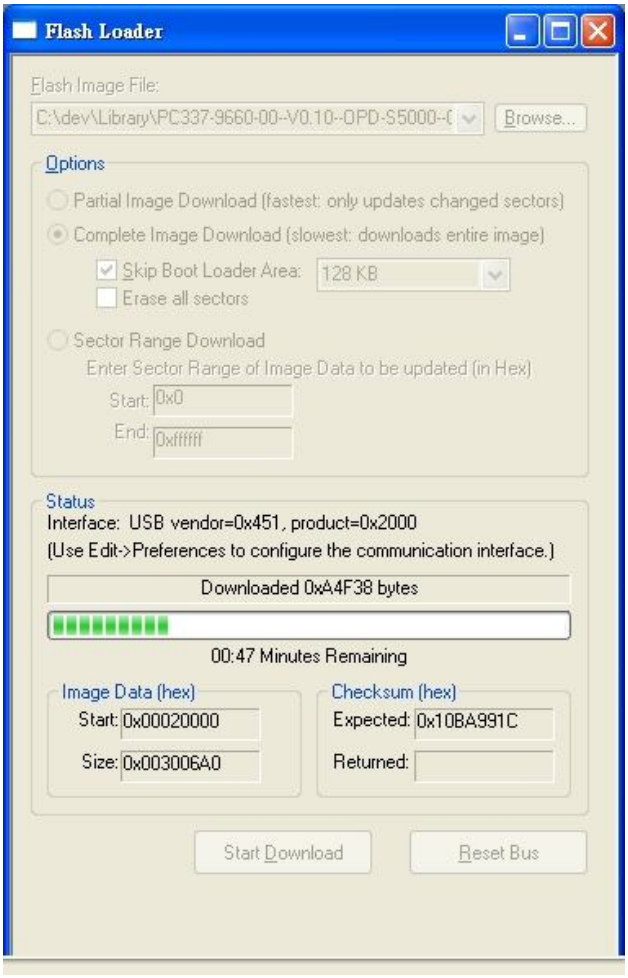
Picture 1: Skip boot loader



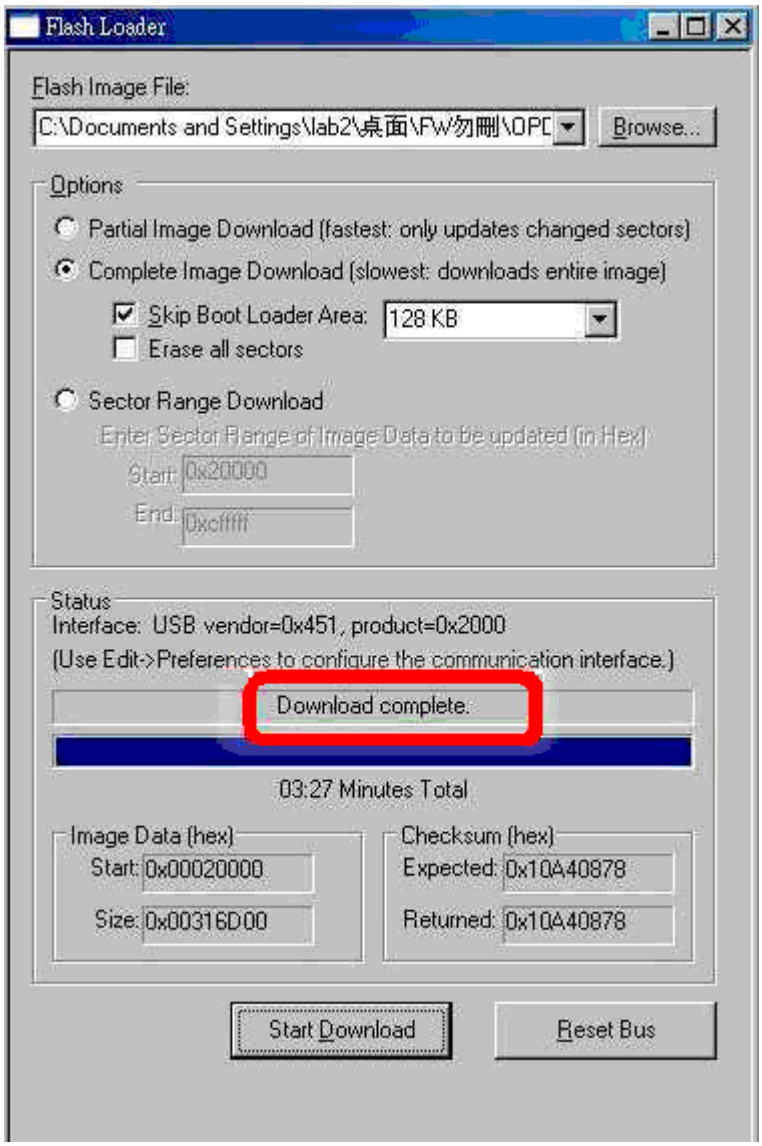
Picture 2: Overwrite boot loader



10. Press to start download firmware into projector.



11. Projector will turn on automatically when FW update is finished ("Download complete" will appear). Press "MENU" or "4-direction" navigator button to turn off the projector (NOTE: "Power" button does not function at this point). Cooling process (fans spinning) will then start. Unplug the power cord when the cooling process is complete; otherwise, the projector will automatically switch back on again.



12. Plug in the power cord, press "Power" button to turn on the projector. The projector will function as usual

3 Machine Disassembly and Replacement

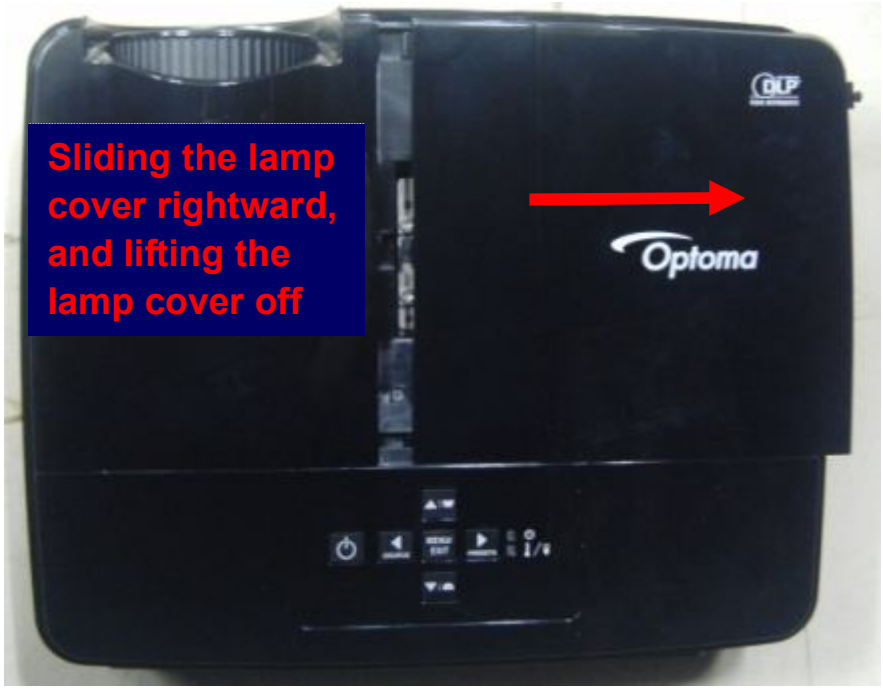
3.1 Tools

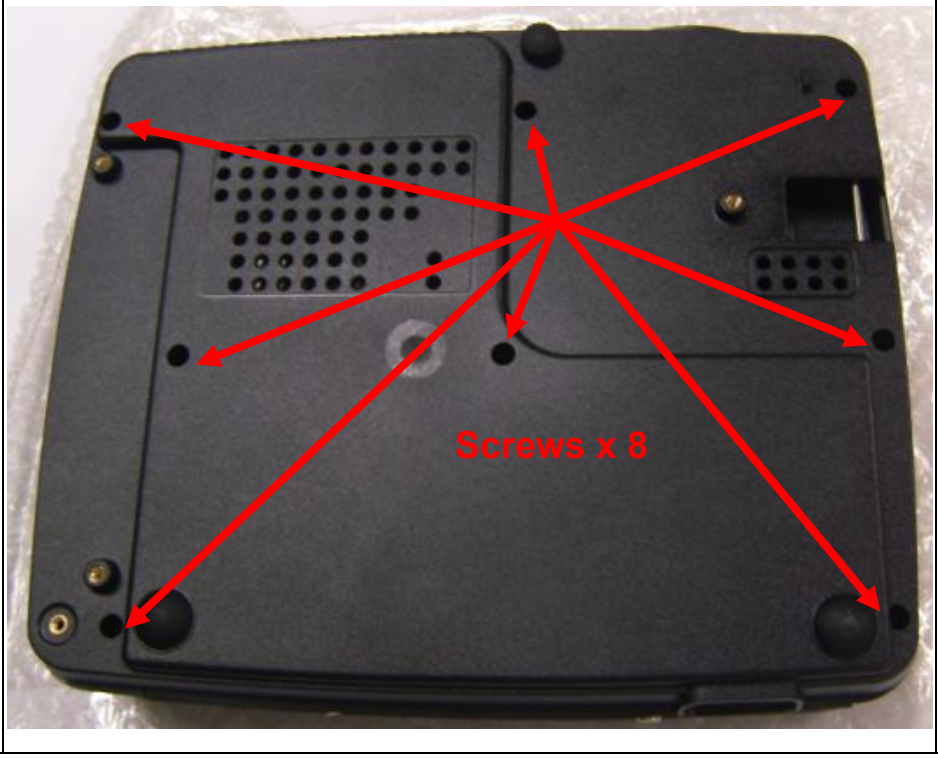
Item	Photo
Long Nose Nipper	
Hex Sleeves 5mm	
Screw Bit(+):107 Screw Bit(+):101 Screw Bit(+):102	
Anti-static wrist strap	
Anti-static wrist gloves	

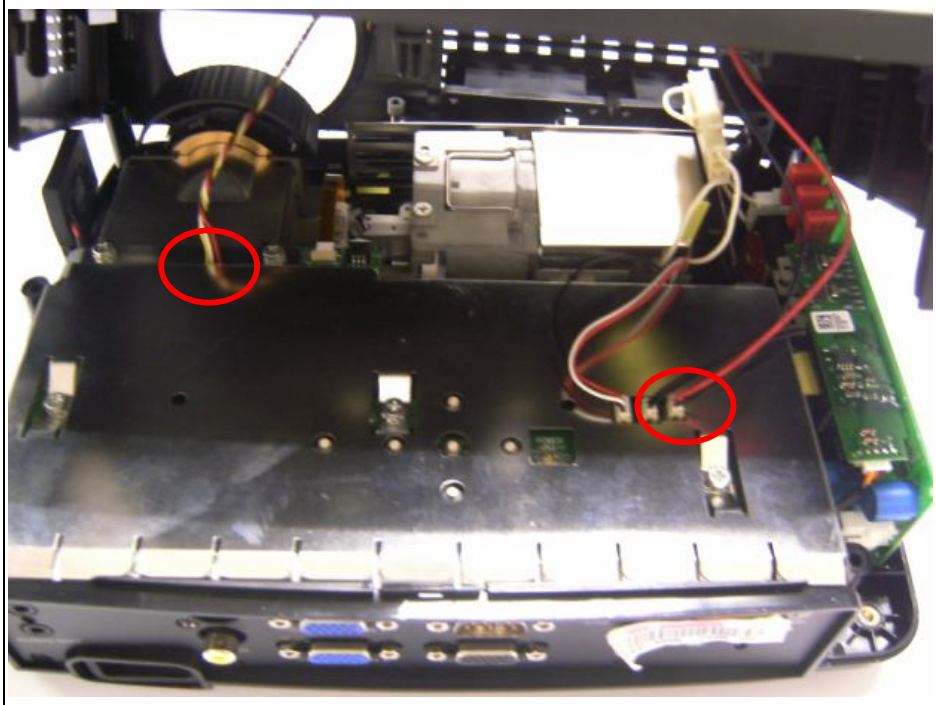
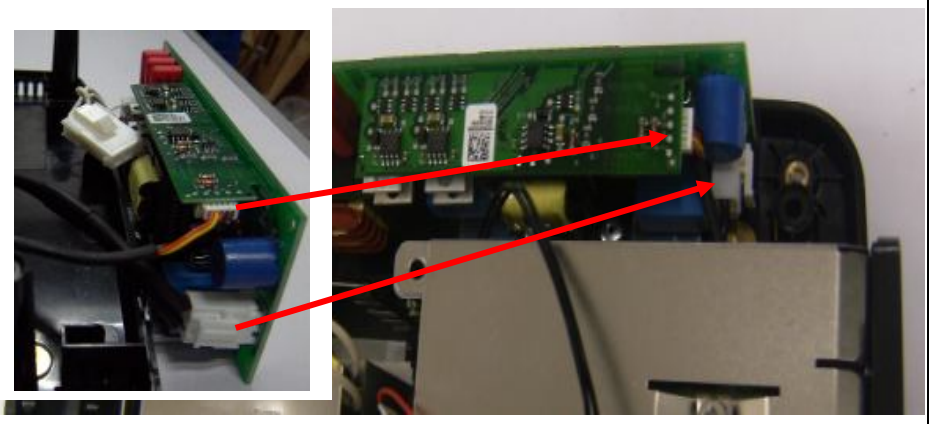
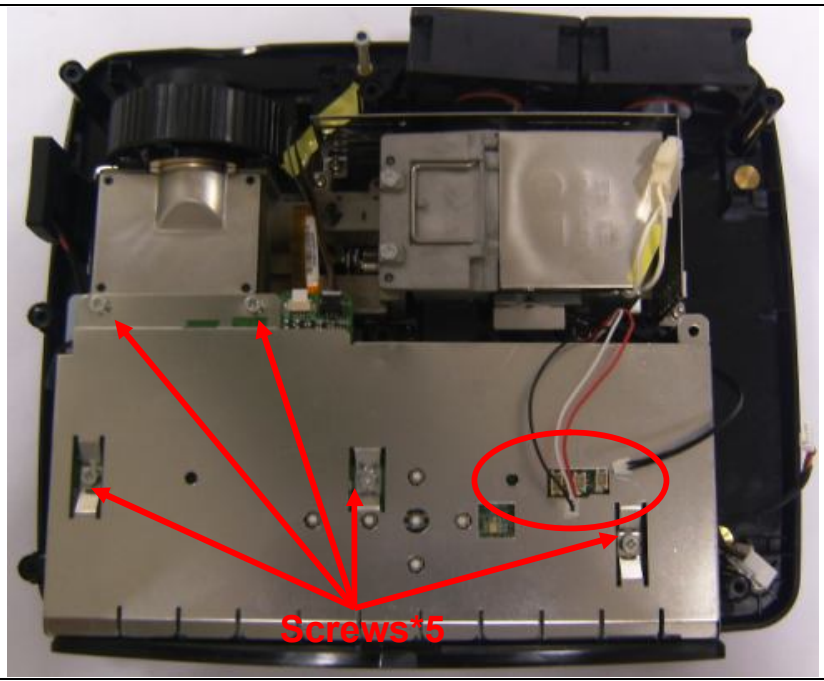
3.2 Disassembly Procedure

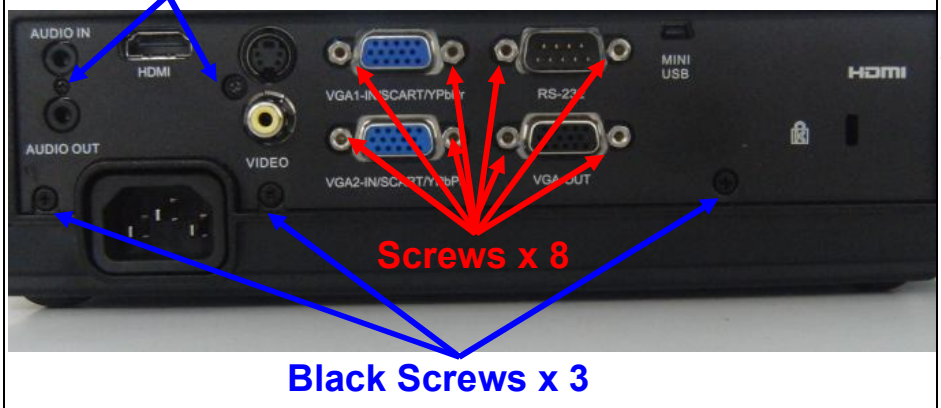
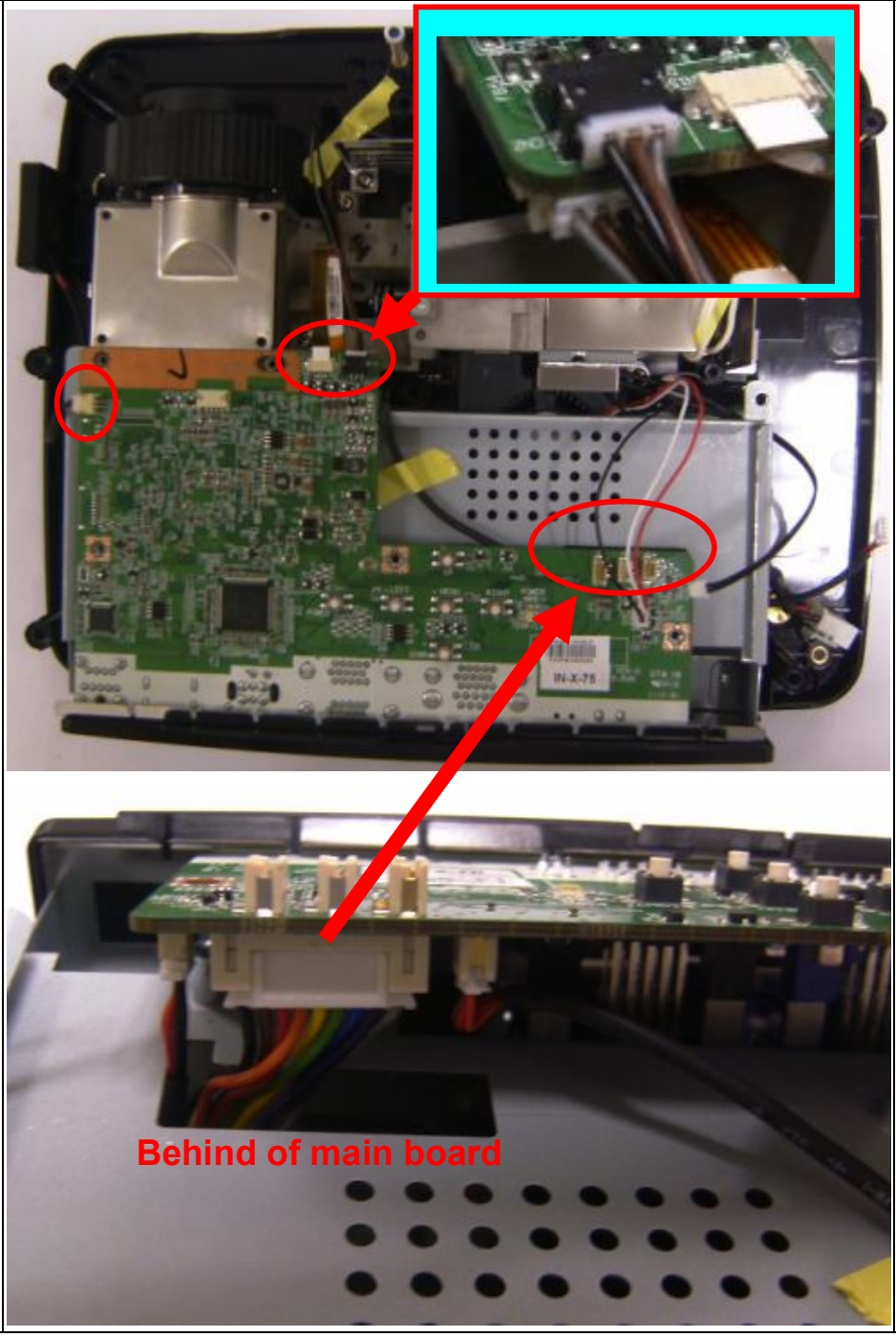
Warning

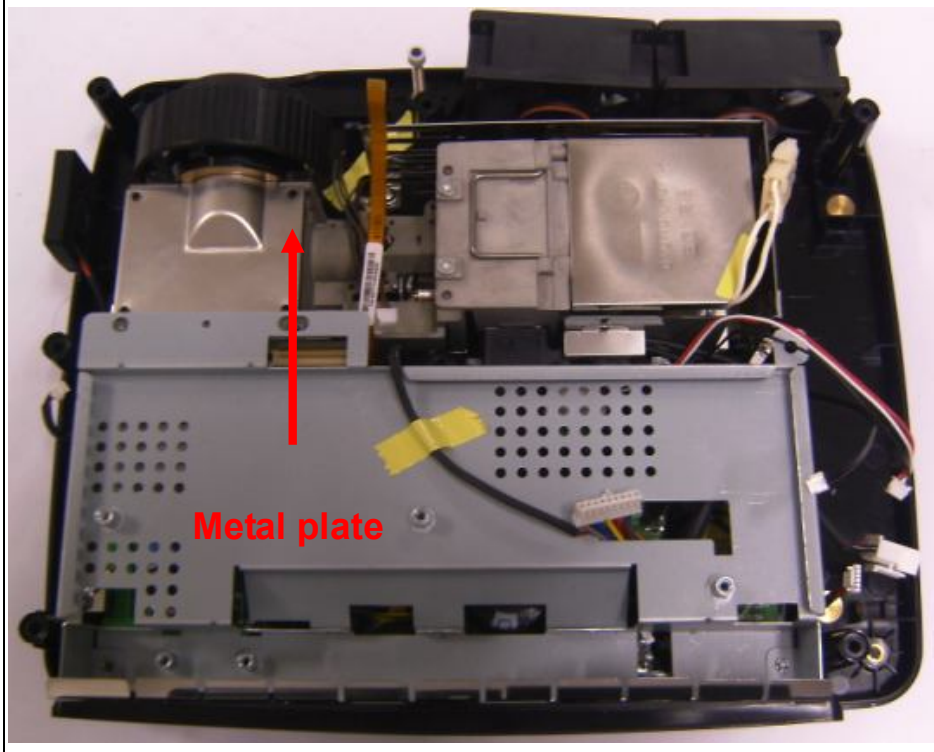
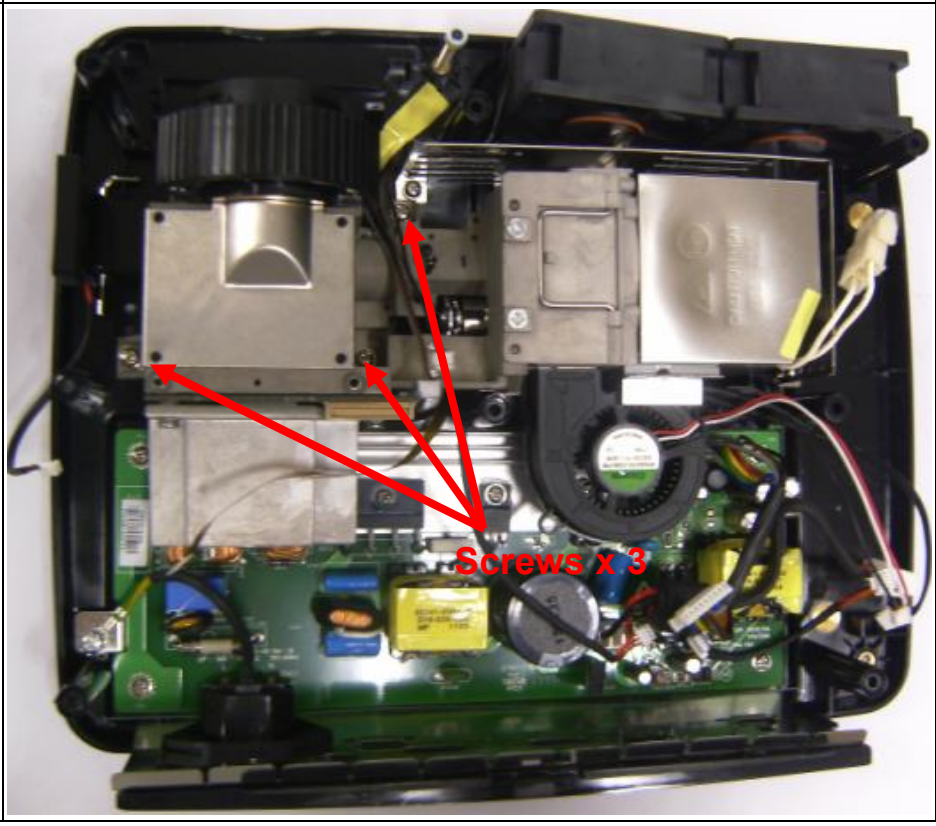
- Put on the Static Electricity Ring when starting for repair.
- Repair Environment suggest in Clean-room class 10000. Do not remove Optical Engine or DMD panel outside the clean room. Please return the optical engine to supplier if your repair condition can not meet the requirement.
- While screwing or unscrewing screws, please keep the screwdriver straight. Keeping screwdriver inclined will damage the screw holes.
- Please turn off the power before replacing any parts.
- Please wait for the projector lamp cooling down and turn off the power before changing it. Never touch or hit the lamp module when replacing the lamp.
- When you replace the projector lamp, never touch the new lamp with your bare hands. The invisible residue left by the oil on your hands may shorten the lamp life. Use lint-free gloves or finger cots are recommended.

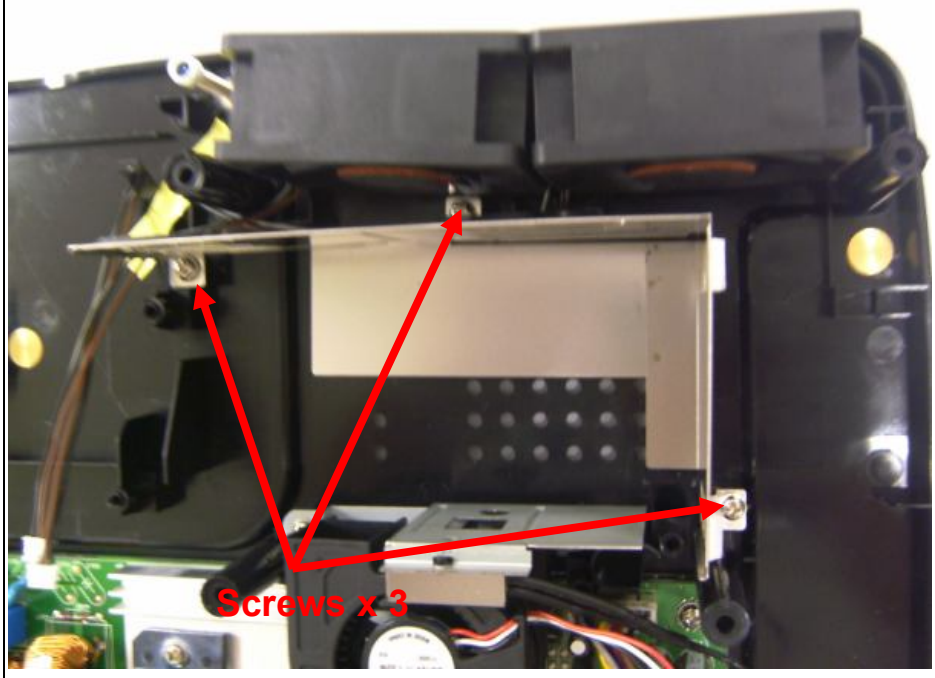
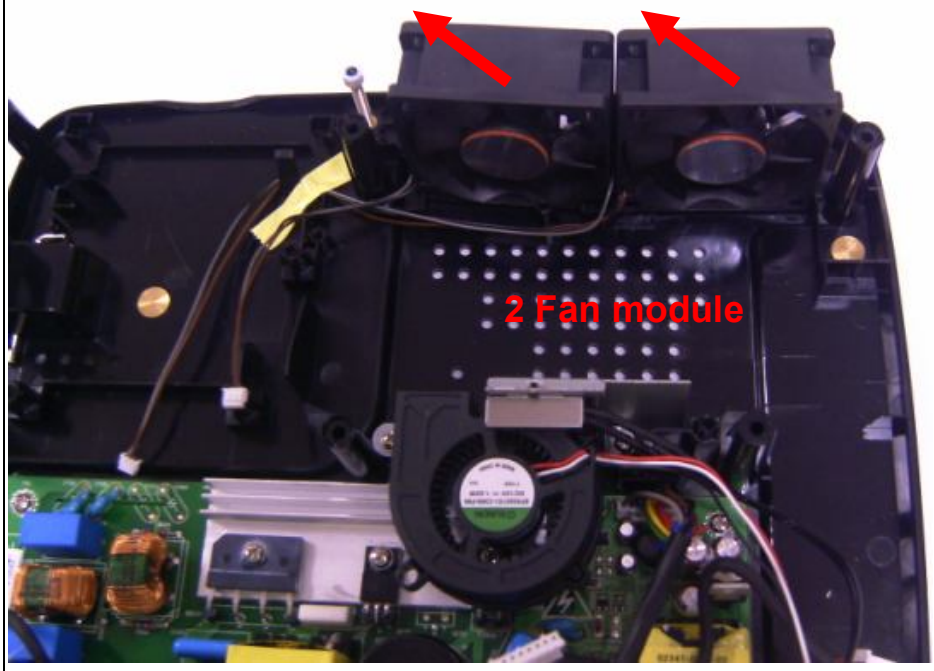
Step	Figure	Description
1		. Shown you the projector. Rotate the focus ring left and remove it.
2		1. Unscrew the screw on the side of the lamp cover.
		2. Sliding the lamp cover forward, and lifting the lamp cover off.

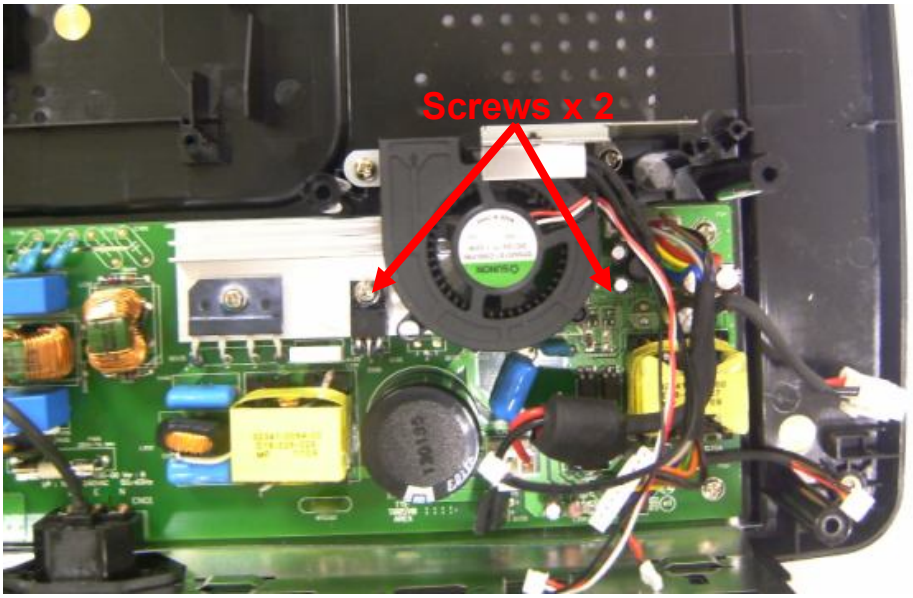
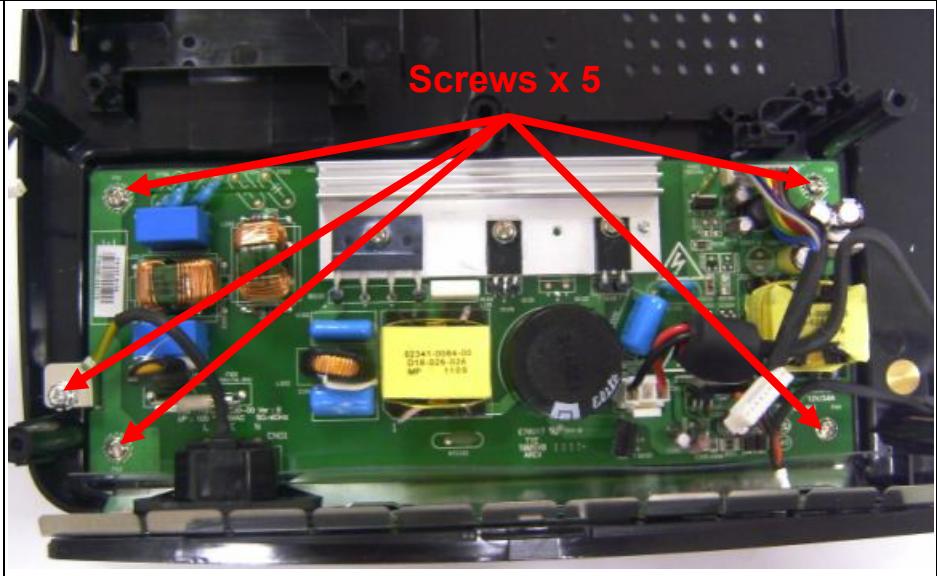
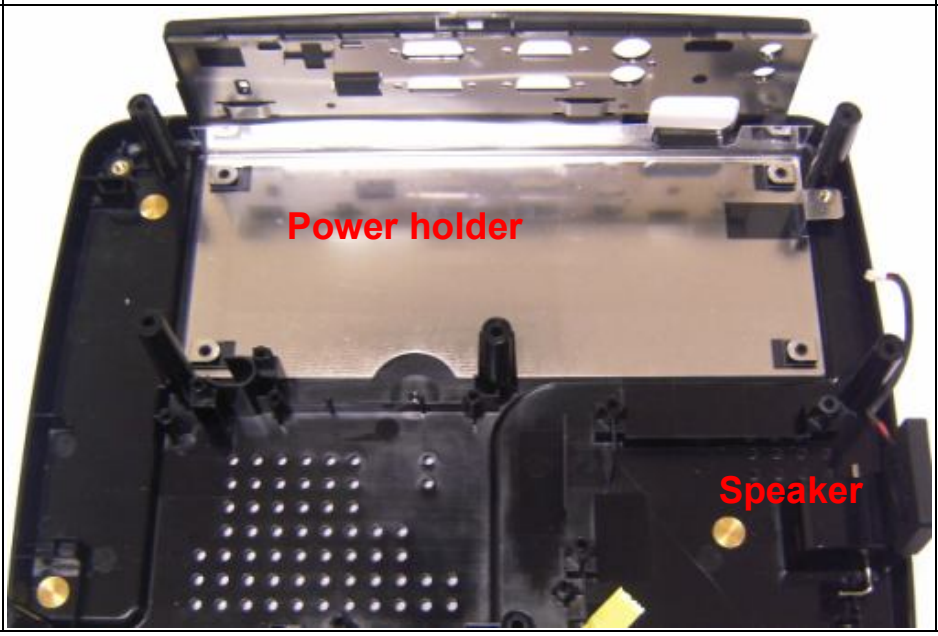
Step	Figure	Description
3		Disconnect the lamp connecter as shown.
4		Flip the projector on the table. Removing screws x 8 on the bottom cover as show.

Step	Figure	Description
5		Lifting the top cover off upward gently, disconnect the front IR wire and the safety switch wire then remove the top cover.
6		Disconnect the two wires and remove the ballast module.
7		Remove the screws*5 on the main board plate, disconnect the two wires and take the MB plate off

Step	Figure	Description
8		Removing the screws on the back cover as shown
9		Show you the main board and the connectors. Disconnect all wires connected on the main board and remove the main board. Please note there are 3 wires connect with the behind of main board.

Step	Figure	Description
10		Remove the metal plate.
11		Unscrew the 3 screws and remove the Optical Engine.

Step	Figure	Description
12		Unscrew the 3 screws then remove Fin outlet.
11		Remove the 2 Fan module.

Step	Figure	Description
12		Removing the 2 screws and take off the Fan3 module.
13		Unscrew the 5 screws and remove the power board.
14		Remove the power holder and the speaker.

4 Troubleshooting and Verifying the Repair

This chapter provides technicians with electronic background how to maintain the product. Moreover, you can get the appropriate operation to solve some complicated problems of component repairing and professional problems.

4.1 Troubleshooting

Warning

- Do not directly look into the lens to avoid eyesight damages.
- The projector is equipped with ventilation holes (intake) and ventilation holes (exhaust). Do not block or place anything near these slots, or internal heat build-up may occur, causing picture degradation or damage to the projector.

Confirm Software and hardware

(1) Confirm lamp using hours

(2) Confirm LED indicator

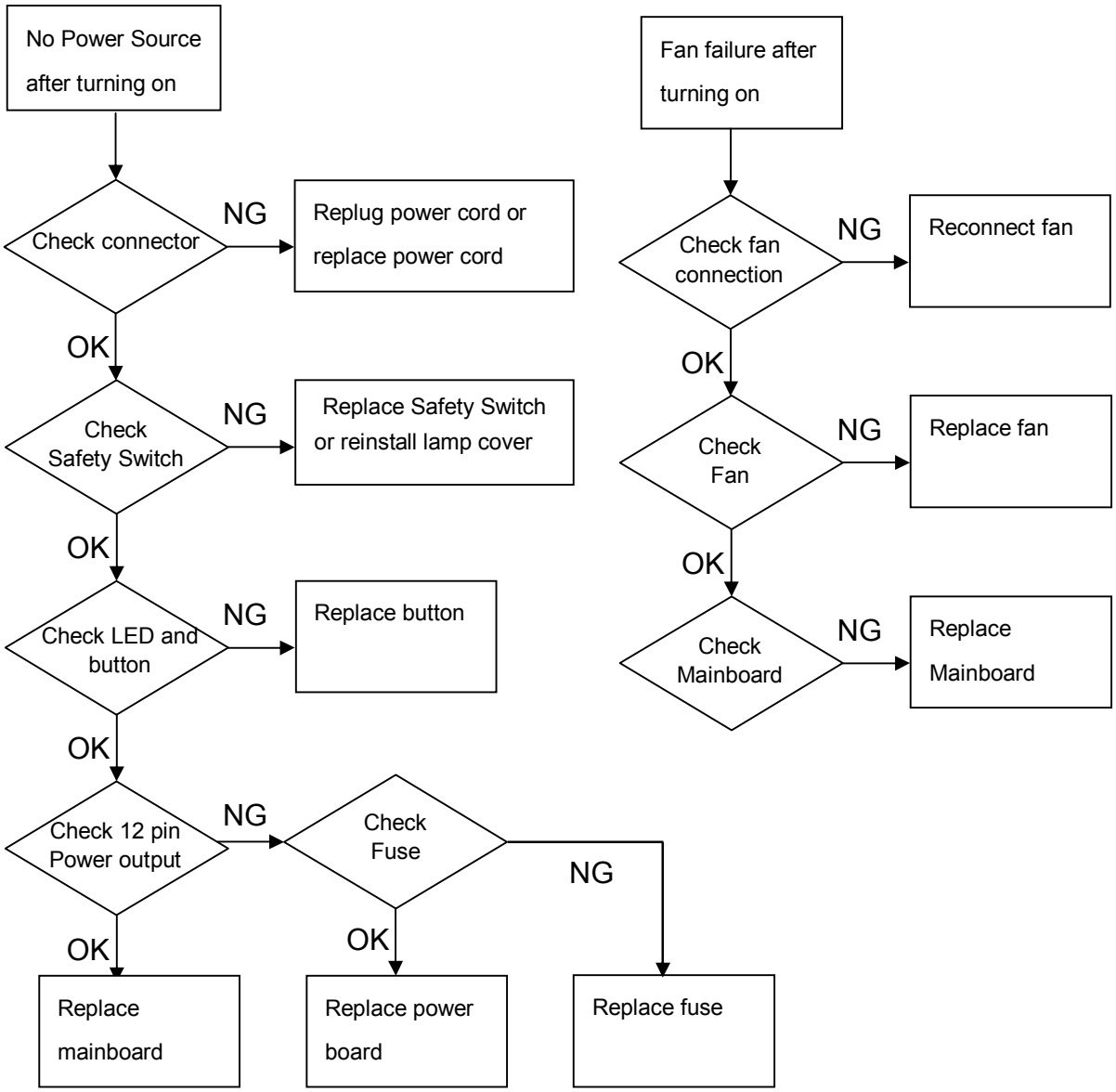
The Status Indicator Panel on top of the projector indicates the state of the projector and can help you troubleshoot.

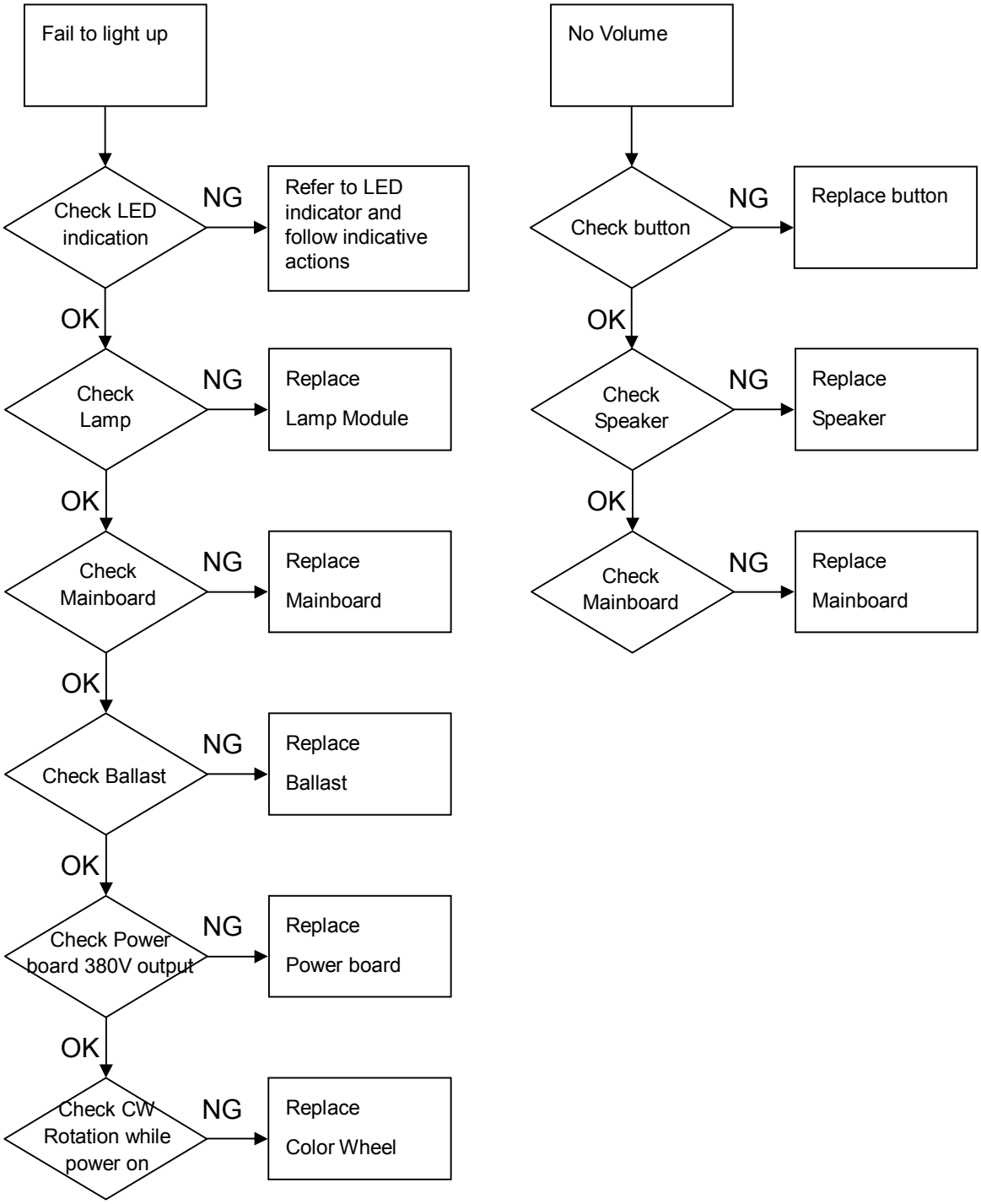
Projector Status	POWER	TEMP	LAMP
Standby mode	**Blue** solid	Off	Off
Normal running mode	Flashing 30 seconds after powering on and then become solid **Blue**	Off	Off
Normal cooling	**Blue** solid	**Blue** solid	**Red** solid
Lamp ignition failed	**Blue** solid	Off	**Red** flashing
Lamp life end	**Blue** solid	Off	**Red** solid
Temp error	**Blue** solid	**Blue** flashing	Off
Fan error	**Blue** solid	**Blue** solid	Off
Color wheel or DMD error	**Blue** flashing	**Blue** flashing	**Red** flashing

(3) Confirm cable connection well.

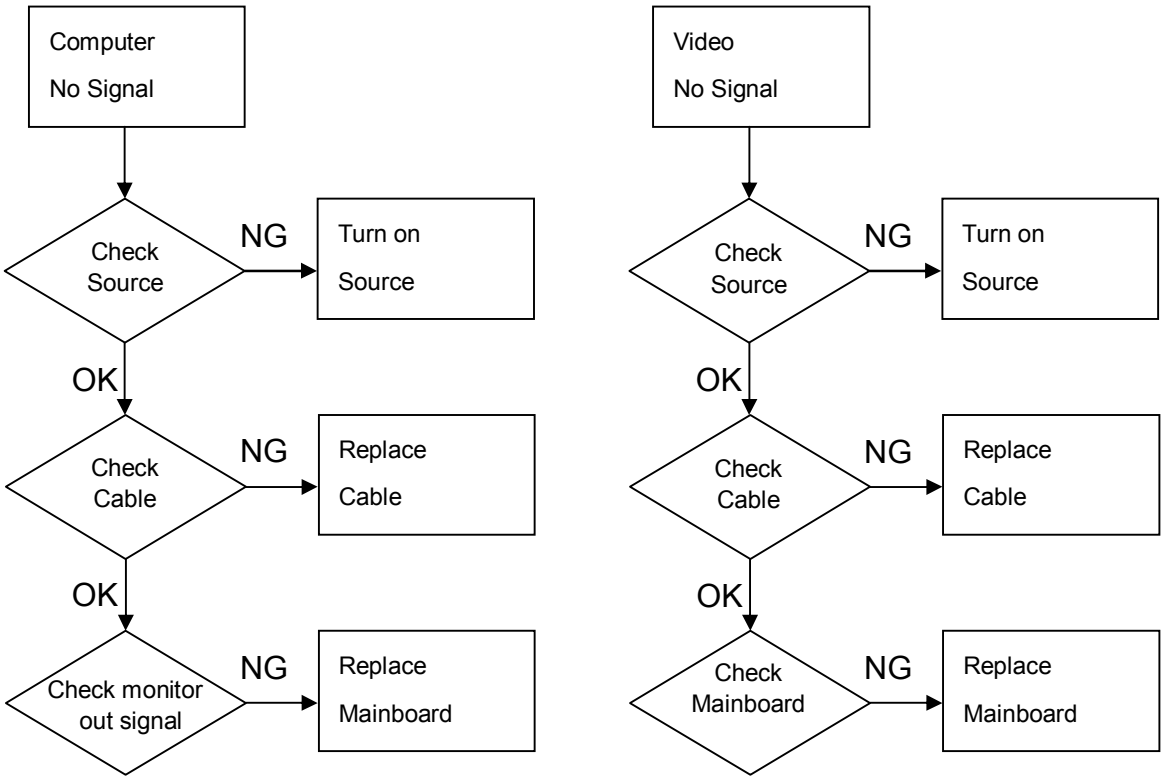
Note: Swapping modules that may be defective with others known to be good is generally an ideal way to find the module responsible for the problem. A failure symptom is rarely caused by more than one module, so you will not usually need to replace more than one to correct a particular failure. Whatever main board, ballast, IR board, power board, lamp module or optical engine are all suitable to check by swapping modules.

Power Source Troubleshooting:




Fail to light up
Check LED indication
NG
Refer to LED indicator and follow indicative actions
OK
Check Lamp
NG
Replace Lamp Module
OK
Check Mainboard
NG
Replace Mainboard
OK
Check Ballast
NG
Replace Ballast
OK
Check Power board 380V output
NG
Replace Power board
OK
Check CW Rotation while power on
NG
Replace Color Wheel
No Volume
Check button
NG
Replace button
OK
Check Speaker
NG
Replace Speaker
OK
Check Mainboard
NG
Replace Mainboard

Video Signal Troubleshooting



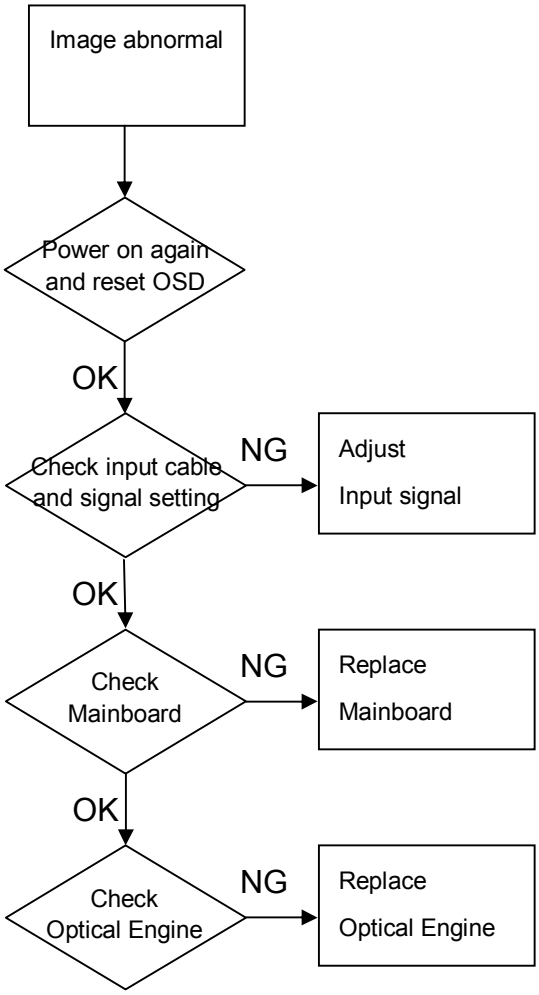
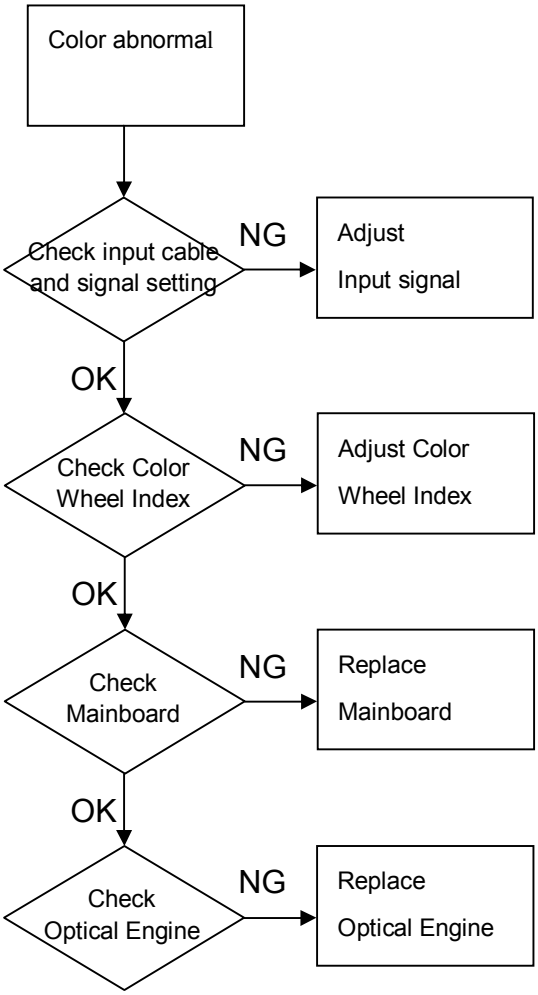
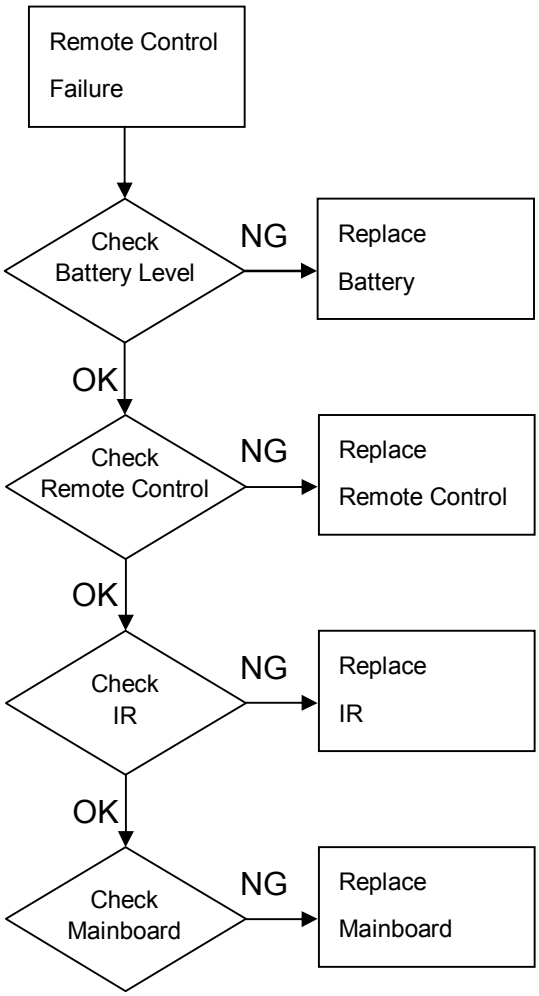
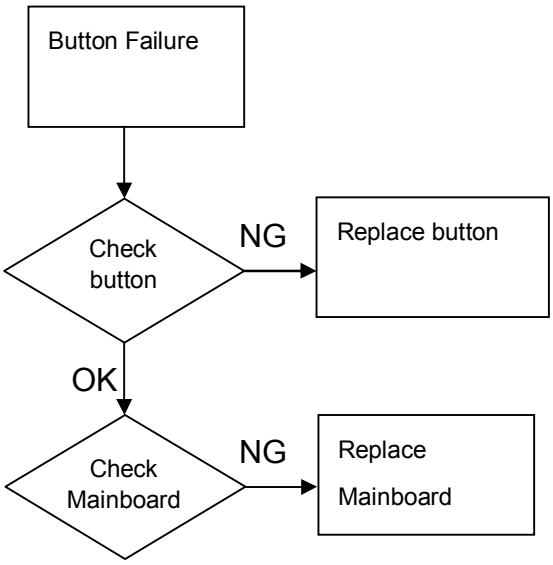


Image abnormal
Power on again and reset OSD
OK
Check input cable and signal setting
NG
Adjust Input signal
OK
Check Mainboard
NG
Replace Mainboard
OK
Check Optical Engine
NG
Replace Optical Engine


Color abnormal
Check input cable and signal setting
NG
Adjust Input signal
OK
Check Color Wheel Index
NG
Adjust Color Wheel Index
OK
Check Mainboard
NG
Replace Mainboard
OK
Check Optical Engine
NG
Replace Optical Engine

Operation Function Troubleshooting





4.2 Verifying the Repair

After repairing projector (Dissembling and assembling projector), Repair center should verify the quality of repaired unit.

(1) Signal test (Each I/O can function normally)

Connect all connector to the jacks one after the other to check whether each channel can project normally

I/O port	**VGA In (SVGA/XGA)**
Test Equipment	Standard Pattern generator (Ex. Quantum data)
Signal format	800*600 60Hz for ES550/ES551 1024*768 60Hz for EX550/EX551

I/O port	**Audio input**
Test Equipment	Connect audio input to audio output from video equipment
Signal format	480i

I/O port	**Video input**
Test Equipment	Video source device
Signal format	NTSC

I/O port	**S-Video input**
Test Equipment	S-Video source device
Signal format	NTSC

I/O port	**HDMI(ES551/EX551 only)**
Test Equipment	HDMI source device (DVD player)

(2) Operation test

Buttons operation

Button description	Test criteria
Power button	1. Touch “power” button and projector will switch on, and in standby mode the LED should solid. 2. Touch the “power” button (Up & Down) should be sensitive 3. The LED indicator lighteness and uniformity normally
Menu/Enter	1. Touch Menu/Enter button can make projector function normally. 2. Touch the button (Up & Down) should be sensitive 3. The LED indicator lighteness and uniformity normally
4-way button	1. Mechanical motion (Up & Down) should be sensitive when touch the 4-way button. 2. Touch 4-way button button can make projector function normally. 3. The LED indicator lighteness and uniformity normally

Foot adjuster operation

Foot adjuster.	Test criteria
Foot adjuster button	Foot adjusters should stretch downward smoothly by rotate the foot adjuster feet

Zoom ring and Focus ring

Ring	Test criteria
Zoom ring	Mechanical motion of rotating Zoom ring to the end of right and left by hand should be free from getting stuck.
Focus ring	The feeling of rotating Focus ring to the end of right and left by hand should free from seizing

(3) Image Quality

Projected image size: 60 inches (diagonal length)

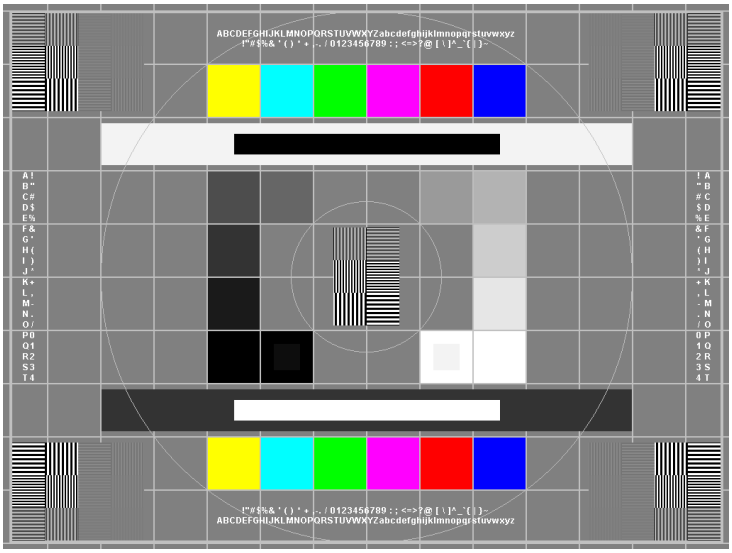
Zoom ring: Adjust zoom ring to wide (Maximum projection size)

VGA

I/O port	**Monitor In (SVGA/XGA/WXGA)**
Test Equipment	Standard Pattern generator (Ex. Quantum data)
Signal format	800*600 60Hz for ES550/ES551 1024*768 60Hz for EX550/EX551
Projected image size	60” in diagonal length

TOP SMPTE133

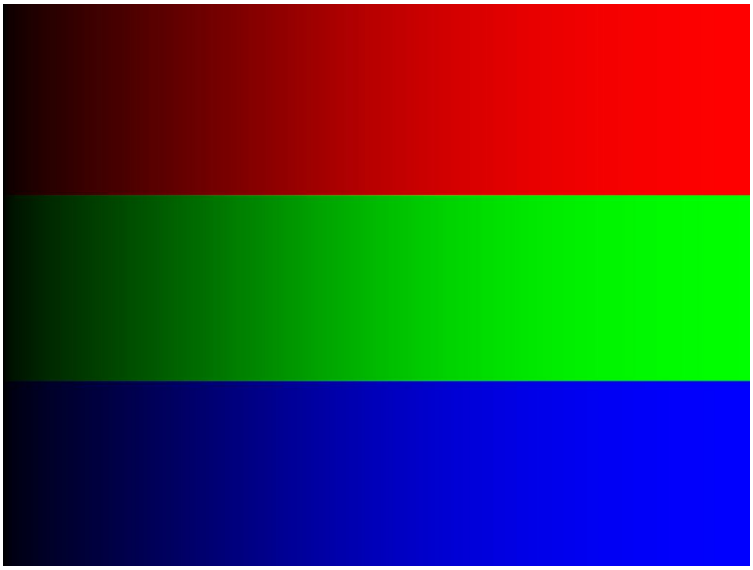
- **Use to confirm overall image quality.**
- Verify there is no noise, tint in the gray background, duplicated columns or other general image abnormalities.
- No twinkling pixels allowed.
- Verify the 5% box is visible within the black square.
- Verify the 95% box is visible within the white square.



RGB Ramps

- **Use to confirm correct colorwheel index delay setting and DMD data line** integrity.
- Verify proper red, green, and blue chromaticity.
- Verify transition from dark to light in each ramp is smooth and consistent.
- Verify there are no missing parts (vertical black bars) of any ramp due to stuck bits.
- Verify there are no light or faded areas in ramps.

  If there are colorwheel index delay is not correctly set.



BLUE 120

- **Use for dark blemish and ghost inspection.**
- Confirm there are no more than four blemishes darker than Blue 120.
- No blemish greater than one inch or 25mm in length/diameter is allowed.
- Confirm there is no ghosting.
- No ghosting is allowed.

GRAY 50

- **Use for light blemish inspection including bright (stuck ON) pixels.**
- Confirm there are no more than four visible blemishes brighter than Gray50.
- No blemish greater than one inch or 25mm in length/diameter is allowed.
- Confirm there are no stuck ON (bright) pixels brighter than Gray50.
- Confirm there are no flickering pixels.
- No more than one bright pixel is allowed in the Pond of Mirrors.

WHITE

- **Use for lumens and uniformity measurements, banding adjustment and inspection of dark (stuck OFF) pixels, minor blemishes.**
- Confirm there are no more than six total of light and dark blemishes
- Confirm no blemish is greater than five inches in length/diameter.
- Confirm there are no more than four stuck off pixels.
- Verify no banding.
  - ◆ If banding adjustment can't completely eliminate banding use **Banding Referee** image to make final determination.

BANDING REFEREE GRAY 245

- **The goal is always to completely eliminate banding. If there still is a very small amount of residual banding after the best banding adjustment has been made use the Banding Referee to make final determination of acceptance.**

Set UUT to Film gamma when using this image

• Distance from edge of image to Gray 245 band is 20 pixels.

• No banding appearing beyond the outer rectangle is allowed.

• No banding appearing darker than the Gray 245 band is allowed.

- ◆ Both of the above two conditions must be satisfied for acceptance.

FOCUS

• **Use to evaluate focus sharpness and uniformity.**

• Focus on the center icon. Then adjust focus to achieve best overall focus.

• Verify all icons have clear resolution and white space can be seen between the green lines.

• Zoom to full Tele (small image) and verify all icons have clear resolution and white space can be seen between the green lines.

Audio

I/O port	**Audio**
Test Equipment	Speaker &DVD player
Signal format	480i
Criteria	The audio out is normal

Video

I/O port	**Video**
Test Equipment	Standard Pattern generator (Ex. Quantum data)&DVD player
Signal format	NTSC
Criteria	No apparent color deviation on the projected image

S-Video

I/O port	**S-Video**
Test Equipment	Standard Pattern generator (Ex. Quantum data)&DVD player
Signal format	NTSC
Criteria	No apparent color deviation on the projected image

HDMI

I/O port	**HDMI(ES551/EX551 only)**
Test Equipment	HDMI source device, standard Pattern generator or DVD player
Criteria	No apparent color deviation on the projected image

(4) Resolution

I/O port	VGA
Test Equipment	PC
Test Method	1. Rotate Zoom ring to wide mode (Maximum projected image) 2. Fix projector to set diagonal length of projected image to 60”. 3. Adjust focus ring to make resolution of 4 corners and center are balanced. 4. Check he characters should be recognized easily. 5. Rotate Zoom ring to tele mode (Minimum projected image) 6. Adjust focus ring to make resolution of 4 corners and center are balanced. 7. Check the characters should be recognized easily.

Arial Font Size: 9 pixels 6.8 points
When in the course of human events it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume among the powers of the earth, the separate and equal station to which the Laws of Nature and of Nature's God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation. – We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness. – That to secure these rights, Governments are instituted among Men, deriving their just
Arial Font Size: 10 pixels 7.5 points
When in the course of human events it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume among the powers of the earth, the separate and equal station to which the Laws of Nature and of Nature's God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation. – We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with unalienable
Arial Font Size: 11 pixels 8.3 points
When in the course of human events it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume among the powers of the earth, the separate and equal station to which the Laws of Nature and of Nature's God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation. – We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain
Arial Font Size: 12 pixels 9.0 points
When in the course of human events it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume among the powers of the earth, the separate and equal station to which the Laws of Nature and of Nature's God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation. –
Arial Font Size: 13 pixels 9.8 points
When in the course of human events it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume among the powers of the earth, the separate and equal station to which the Laws of Nature and of Nature's God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel

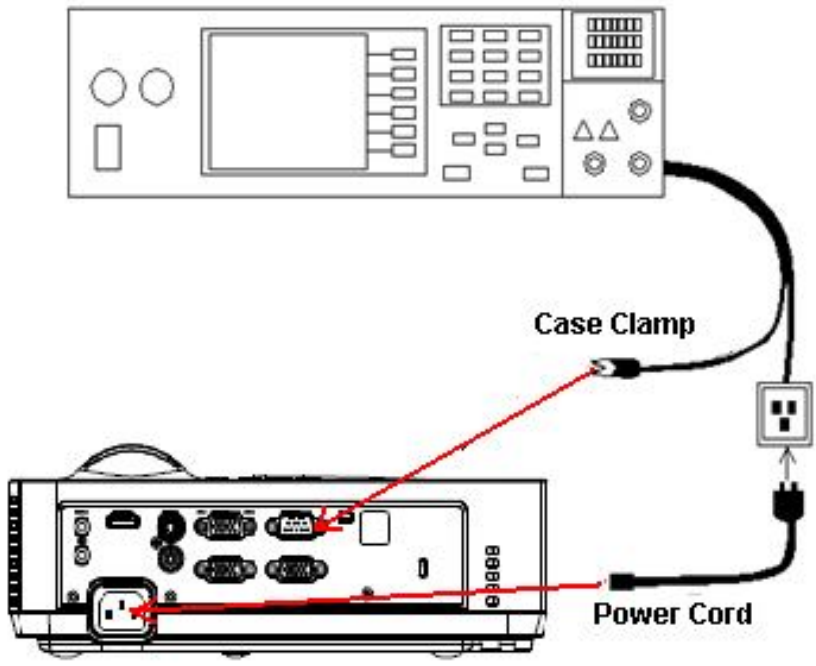
(5) Front infrared sensor

Device	Front infrared
Test Equipment	Remote controller
Test method and Criteria	Operate remote controller to test front sensor is normal

(6) Brightness measurements

Test items	Brightness measurements
Test Equipment	Chroma automatic system (The alternative is CL-200)
Test method	Measure 9 points
Criteria	Marketing spec 20% off

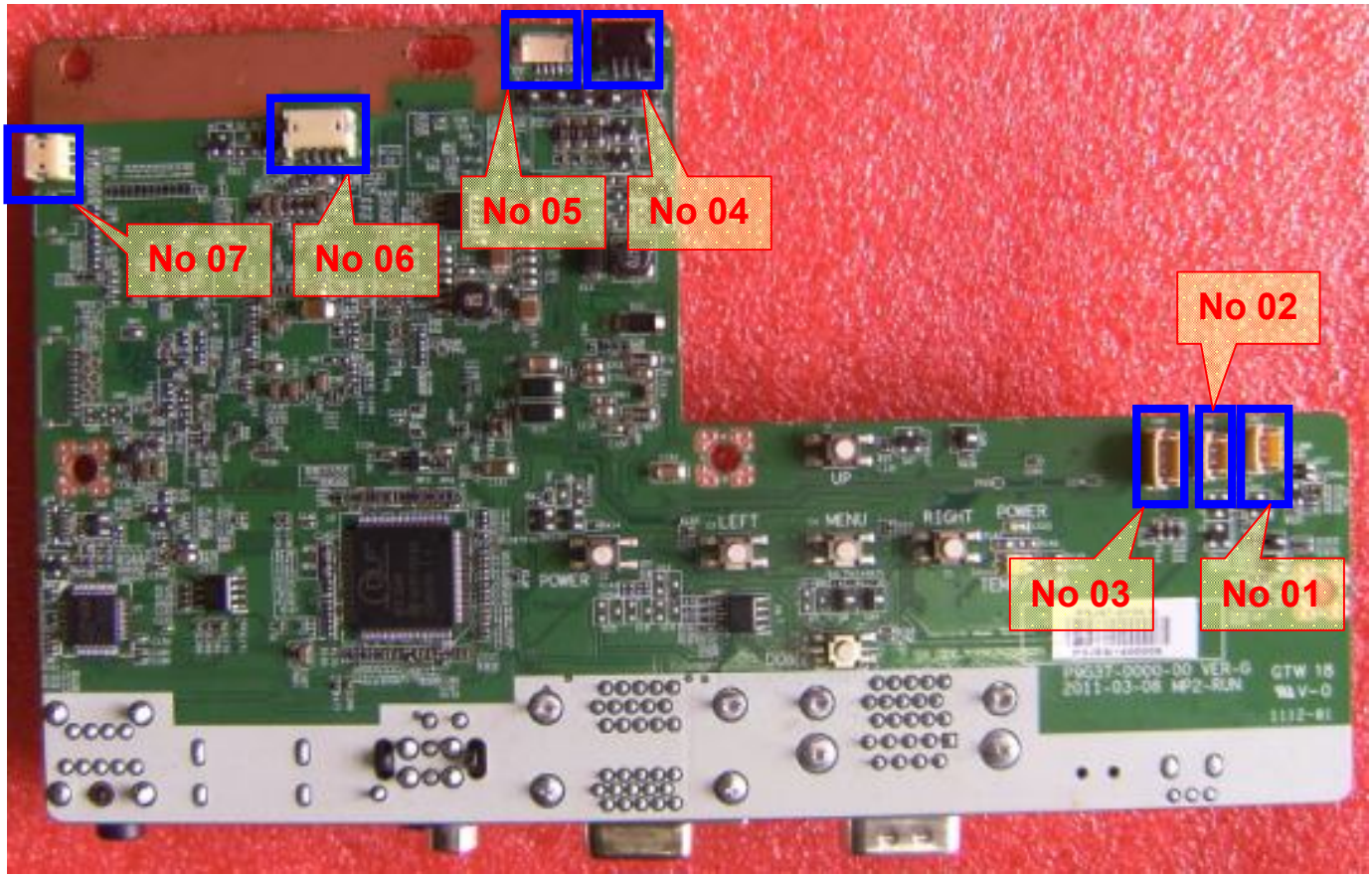
(7) Safety test equipments

Test items	Safety test
Test Equipment	Safety analyzer
Test method	1. Clamp the metal shell of VGA connector 2. Plug the power cord to socket 
Test criteria	GND 30A 3sec 100mΩ DCW 2506V 1sec 10mA Single Step OFF

5 Connector Information

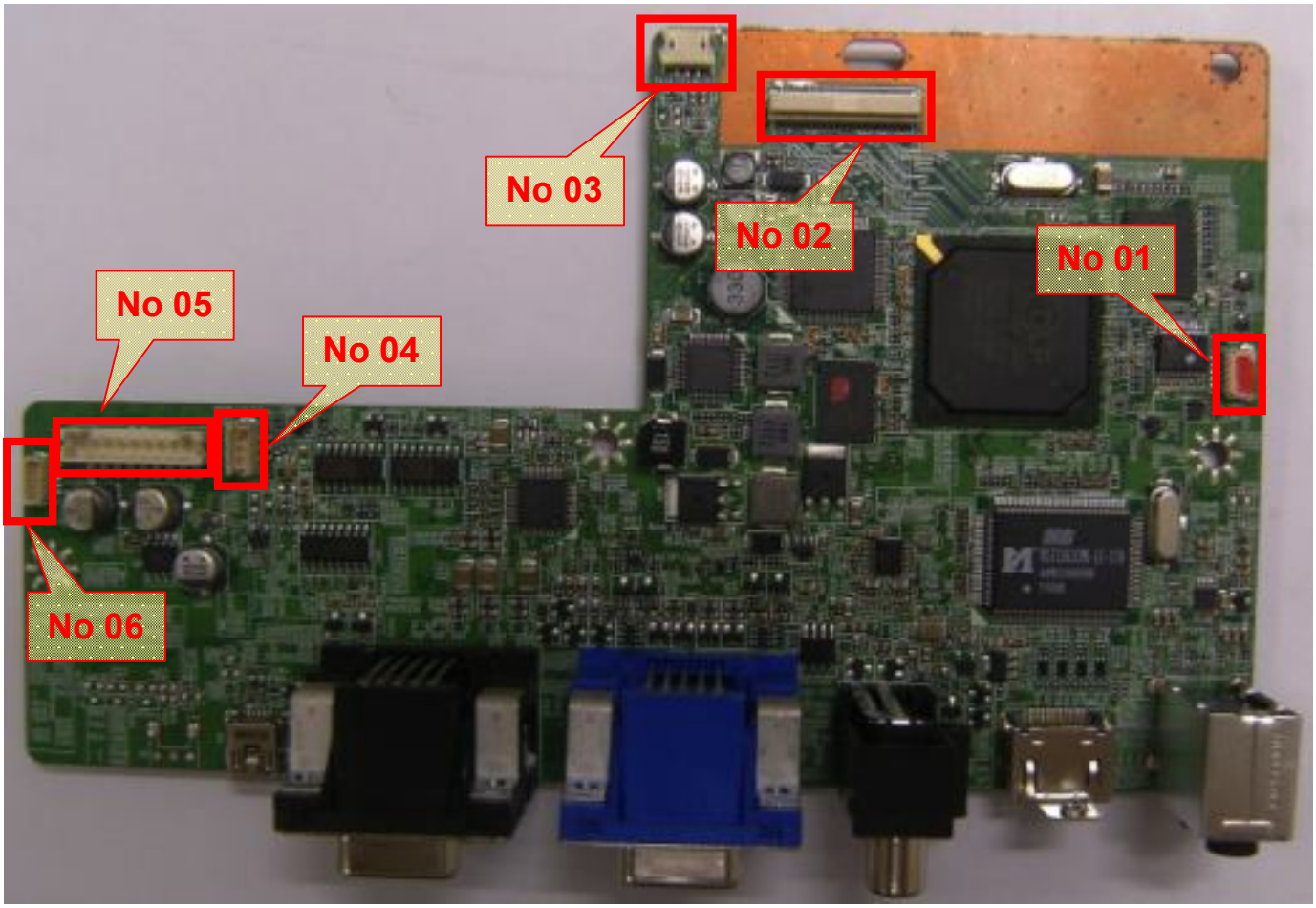
This section provides each connector location on boards and function of each board. They will be useful for your detecting the defective boards.

5.1 Main Board



Connector	Description
No 1	Safety switch
No 2	Thermal sensor
No 3	Fan3
No 4	Fan1
No 5	Color Wheel control
No 6	Front IR
No 7	Speaker

5.2 The backside of mainboard

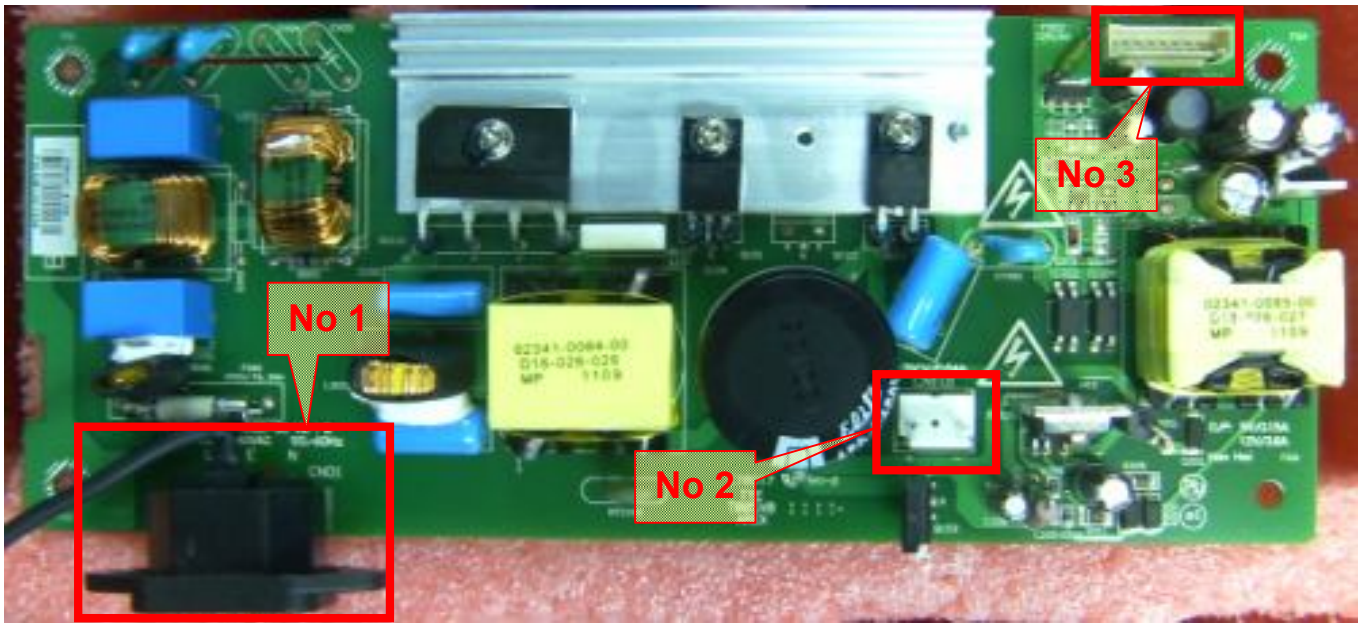


Connector	Description
No 1	/
No 2	Connect to DMD Board
No 3	Fan2
No 4	Color Wheel Sensor
No 5	Connect to Power Board
No 6	Ballast control

5.3 Ballast Board

Connector	Description
No 1	Lamp power supply
No 2	Ignite signal connected to Mainboard
No 3	Power supply

5.4 Power board



Connector	Description
No 1	AC Input
No 2	Ballast Power Supply
No 3	Connect to Main Board

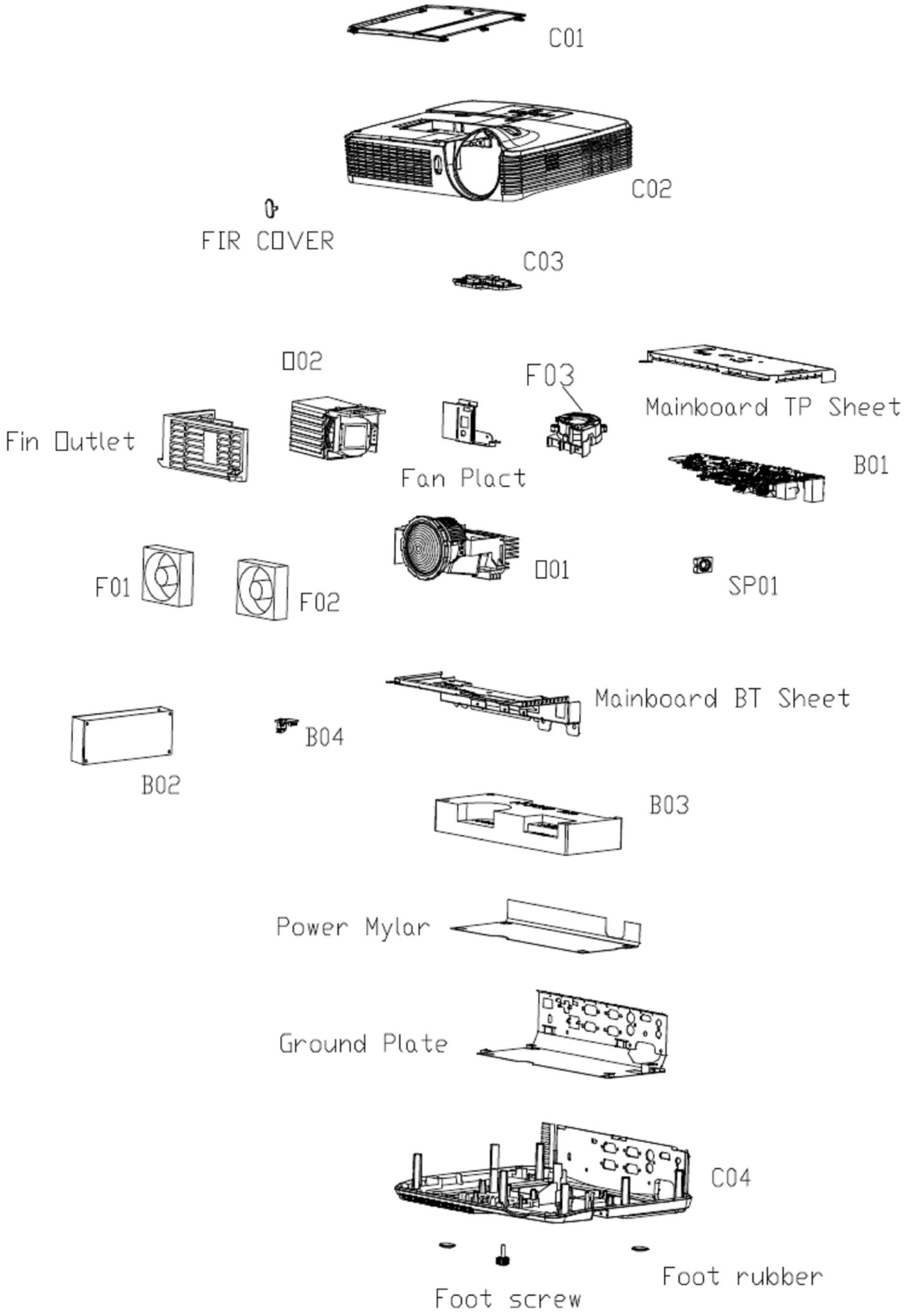
6 FRU (Field Replaceable Unit) List

Introduction

This section is a list of all the FRU removal. Following the FRU table of contents is an enlarged view of the entire projector, which shows the primary FRUs in the projector.

When working on the projector, use appropriate anti-static precautions such as anti-static mats, wrist straps and grounded work surfaces. Failure to do this can destroy static-sensitive components and make the product inoperable.

6.1 Mechanical Drawing



6.2 Board/Module

Key No.	P/N	Description
B01	PA784-7100	ES550_MAIN_DIP_PCB
	PA884-7100	EX550_MAIN_DIP_PCB
	PC384-7100	ES551_MAIN_DIP_PCB
	PC484-7100	EX551_MAIN_DIP_PCB
B02	PA884-8100	POWER_ASY
B03	PA884-9000	BALLAST_ASY
B04	PA884-7500	FIR_DIP_PCB_ASY

6.3 Case/Cover/Bracket Assembly

Key No.	P/N	Description
C01	PA884-4540	LAMP-COVER_ASY
C02	PA884-4500	TOP-COVER_ASY
C03	PA134-4540-99	KEY_ASY
C04	PA884-4510	BOTTOM-COVER_ASY

6.4 Optical Device

Key No.	P/N	Description
O01	PA784-2200	OPTICAL ENGINE SIMPLE_ ES550
	PA884-2200	OPTICAL ENGINE SIMPLE_ EX550
	PC384-2200	OPTICAL ENGINE SIMPLE_ ES551
	PC484-2200	OPTICAL ENGINE SIMPLE_ EX551
O02	PA884-2400	LAMP MODULE_ES550_EX550
	PC484-2400	LAMP MODULE_ES551_EX551

6.5 Fans

Key No.	P/N	Description
F01	02394-0151-00	FAN.1
F02	02394-0150-00	FAN 2
F03	02394-0152-00	FAN 3

6.6 Speaker

Key No.	P/N	Description
SP01	02413-0117-00	SPEAKER